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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

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COMMERCIAL FISHERIES REVIEW

July 1966 Washington, D. C. Vol. 28, No. 7

SPECIES COMPOSITION OF THE NORTH CAROLINA INDUSTRIAL FISH FISHERY

By William E. Fahy*

ABSTRACT

The North Carolina industrial fish fishery produces an average annual catch of 8 to 11 million pounds of fish caught incidental to regular fishing operations. Although pound nets and long-haul seines are used in this fishery, about 95 percent of the catch is obtained from trawl nets operating in sounds and coastal ocean waters. About 90 percent of the catch is processed into fish meal, 2 percent into pet food, and the remainder frozen as feed for use on fur farms and for crab-pot bait.

About 80 percent of the trawl catch, both in weight and number of fish, consists of young-of-the-year edible fish species, especially croaker, spot, butterfish, and gray sea trout (weakfish). In the long-haul and pound-net fishery, about 80 percent of the catch by weight and number of fish consists of nonedible forms, and all fish are somewhat larger than those caught by trawling.

Species (croaker and spot) contributing most heavily to the weight of the catch do so consistently throughout the year. Some species are caught in quantity in only one month out of the year.

INTRODUCTION

In most commercial fishing operations, fish are caught incidentally that are not marketable as food fish; those may be nonedible species or the young of edible species. In the process of being caught, especially in an operation like trawling, most small fish are killed. Formerly considered a nuisance and shoveled overboard, in some areas these dead or dying fish are now brought to port as marketable industrial species for processing in dehydrating plants to the advantage of fishermen and plant operator alike. In North Carolina those fish are known as "trash" or "scrap", and the industry built around the use of them is called the trash-fish industry.

The North Carolina industrial fish fishery is relatively small when compared to the larger ones in New England and the Gulf of Mexico where 70 to 96 million pounds are processed annually. The New England industry is similar to that of North Carolina in that both are supplied by trash fish caught incidental to regular fishing operations; the larger industry in the Gulf of Mexico is supplied by a fleet operating solely for industrial species.

Because of public concern about reported landings of large numbers of the young of edible and sport fishes, the North Carolina Department of Conservation and Development provided funds to the University of North Carolina Institute of Fisheries Research to conduct a survey of the industrial fish fishery in 1962 and 1964. Those surveys were designed to provide information concerning the species composition of: (1) the industrial fish catch by weight, (2) industrial fish catch by number of individuals, and (3) the industrial fish catch by month; in 1962 provision was made for determining the species composition of the industrial fish catch by gear used.

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THE FISHERY

FLEET AND LOCATION OF GROUNDS: The industrial fish fishery is prosecuted by approximately 80 shrimp-trawler type boats from 32 to 85 feet in length, operating in sounds and coastal ocean waters from depths of 1 to 21 fathoms, from Wimble Shoals north of Cape Hatteras southward to Swansboro Inlet.

Fig. 1 - Double-rigged shrimp trawlers operating in coastal ocean waters near Beaufort Inlet, North Carolina.

CATCH AND PROCESSING: Throughout the year three dehydrating plants and one freezing plant operate in two North Carolina coastal counties. During the months of March through May the amount of industrial fish processed decreases because the season of the winter-trawl fishery ends in March and the shrimping season begins in mid-May. In 1962, the industrial fish catch totaled 8,064,968 pounds, 91 percent of which was processed into fish meal for use in poultry feed, 2 percent into pet food, and 7 percent frozen for feed on fur farms and for crab-pot bait. In 1964, the total was 11,202,895 pounds, 90 percent; 2 percent, and 8 percent respectively, was processed as above.

HANDLING OF FISH: In trawling operations the net is brought aboard, emptied on deck, and the catch culled for undesirable material (seashells, large sharks and skates, and debris), shoveled into the fish hold, and iced. Most vessels return to port at the end of the day when the catch is hoisted from the hold and transported by hand truck or conveyor to the sorting table of a fish plant. Here marketable edible fish are sorted according to species and trash fish are discarded into wooden fish boxes. The trash fish are iced and sent by truck to a processing plant.

Any vessel that has already separated its trash fish from edible species at sea often unloads its trash fish directly at the processing plant. Here the fish are shoveled from the boat to a conveyor running into the plant.

In the long-haul and pound-net segment of the industrial fish fishery, the catch is culled of undesirable material and iced down in the hold of the relatively small, shrimp-trawler type boat. Later, while still on the fishing grounds, the catch is transferred from the fishing boat

to the hold of a buy-boat. This boat transports the iced catch to the fish plant where edible species are separated from the trash fish. The trash fish are iced and transported to a processing plant.

Fishermen receive one dollar a box for trash fish averaging 125 pounds per box.

SAMPLING METHOD

Sampling of the industrial fish catch was planned so that normal handling procedure at the fish plant was not hindered. A sample consisted of one wooden commercial fish box of trash fish; during the years of the study samples varied from 86 to 150 pounds. A sample box was filled directly from the sorting table. If the load had already been sorted prior to arrival of the investigator, the first full box encountered on the truck or loading platform was taken as the sample. When samples were taken from vessels unloading at a dehydrating plant, trash fish were shoveled from the boat into a box. The fish were sorted according to species; this species subsample was weighed, the number of individuals counted, and the information recorded.

Fig. 2 - Trash fish caught incidental to regular fishing operations being shoveled from trawler at dock.

THE 1962 SURVEY

Although the sample year extended from February 1962 through January 1963, it is considered to represent 1962. A total of 104 samples was collected, 53 from trawling operations and 51 from long-haul and pound-net operations. A total of 108,217 individual fish were counted with a total weight of 13,020 pounds. This weight represents almost 0.2 percent of the industrial fish catch. Samples from long-haul and pound-net operations were not separated according to gear because catches from these two were mixed aboard the buy-boats. Samples from trawling operations were taken throughout the sample year, but those from long-haul and pound-net operations were taken through most of the May-October fishing season. At least 95 percent of all trash fish landed was taken by trawlers, therefore, it would be unrealistic to consider samples from the long-haul and pound-net fishery equally representative with trawl samples in describing the industrial fish catch. Data from long-haul and pound-net samples are presented only to provide a comparison of species composition of catch according to gear used.

SPECIES COMPOSITION OF THE CATCH IN THE TRAWL FISHERY: Table 1 gives the species composition of 53 samples from the trawl fishery. A total of 79 fish species were caught. Nine species, each accounting for 1.0 percent or more of the total sample weight (column 4), are listed individually; these comprised 85.0 percent by weight and 86.4 percent by number of individuals of the total trash sample. Thirty-one species, each accounting for less than 1.0 percent by weight of all samples and shown collectively, constitute 8.8 percent by weight and 8.4 percent by number of individuals. Thirty-nine species, each occurring infrequently, collectively contributed 2.3 percent of the weight and 5.0 percent of the number of individuals. Invertebrates, chiefly nonedible crabs and squid, contributed 3.9 percent of the trash sample by weight.

The first three species--croaker, spot, and butterfish--are edible species and comprised 67.5 percent of the catch by weight and 68.7 percent by number of individuals. Three other edible species included in the first nine--hogfish, gray sea trout, and sand perch--accounted for an additional 9.3 percent of the sample by weight and 8.6 percent by number of individuals.

Among the 31 species, each accounting for less than 1.0 percent by weight of all samples, 11 are edible and contributed 2.9 percent of the sample by weight and 2.5 percent by number of individuals. Thus, 17 edible forms comprised 79.7 percent of the industrial fish catch by weight and 79.8 percent by number of individuals. The contribution of 9 edible species found among the 39 forms that occurred infrequently was estimated to be less than 0.1 percent of the catch by weight and was not considered.

Table 1 - Composition of 53 Industrial Fish Samples from 1962 Trawl Fishery in North Carolina, Showing by Species and Categories, Number of Individuals Counted, Weight in Pounds, Percent Composition of Samples by Number of Individuals and Weight, and Average Weight of Individuals

Species		No. of Ind.	Wt. in Lbs.	% Comp. by No.	% Comp. by Wt.	Avg. Wt. Ind. (Oz.)
Common Name	Scientific Name					
Croaker	Micropogon undulatus	26,417	2,765.9	40.6	42.6	1.7
Spot	Leiostomus xanthurus	12,327	1,129.8	19.0	17.4	1.5
Butterfish	Poronotus triacanthus	5,891	490.9	9.1	7.5	1.3
Longspine porgy	Stenotomus caprinus	3,893	324.2	6.0	5.0	1.3
Hogfish	Orthopristis chrysopterus	2,868	277.2	4.4	4.3	1.5
Gray trout	Cynoscion regalis	1,916	203.4	2.9	3.1	1.7
Pinfish	Lagodon rhomboides	1,928	126.9	3.0	1.9	1.1
Sand perch	Bairdiella chrysura	856	125.2	1.3	1.9	2.3
Clear-nose ray	Raja eglanteria	67	82.7	0.1	1.3	19.7
31 species, each accounting for less than 1.0% by weight		5,523	571.7	8.4	8.8	-
39 species occurring infrequently		3,323	149.6	5.0	2.3	-
Invertebrates		-	251.3	-	3.9	-
Totals		65,009	6,498.8	99.9	100.0	-

Nonedible species of fish and invertebrates comprised the remaining 20.3 percent of the trash fish by weight and 20.2 percent by number of individuals. Of those, the longspine porgy, pinfish, and clear-nose ray accounted for almost one-half, both in weight and number of individuals.

If the pounds sampled for a given species are divided by the number of individuals counted for that species, an estimate of the average size of individual fish can be obtained. The last column in table 1 provides this estimate of size in ounces for the nine species listed separately. The smallest species, pinfish, averaged 1.1 oz. and the largest, the clear-nose ray, averaged 19.7 percent. With the exception of this ray the remaining eight ranged in average from 1.1 to 2.3 oz. For these species such a weight indicated young-of-the-year.

SPECIES COMPOSITION OF CATCH IN LONG-HAUL AND POUND-NET FISHERY: In table 2 eight species appearing most frequently in this fishery are listed in the same manner as those in table 1. These species accounted for almost 91 percent of the sample weight in this fishery and about 94 percent by number of individuals.

Table 2 - Eight Species Occurring Most Frequently in 51 Industrial Fish Samples from 1962 Long-Haul and Pound-Net Fishery Showing Number of Individuals Counted, Weight of Sample, Percent Composition of Samples by Weight and by Number of Individuals, and Average Weight of Individuals

Species		No. of Ind.	Wt. in Lbs.	% Comp. by No.	% Comp. by Wt.	Avg. Wt. Ind. (Oz.)
Common Name	Scientific Name					
Menhaden	Brevoortia tyrannus	14,384	2,799.9	33.3	42.9	3.1
Pinfish	Lagodon rhomboides	17,236	1,968.2	39.9	30.2	1.8
Thread herring	Opisthonema oglinum	3,470	443.6	8.0	6.8	2.0
Bluefish	Pomatomus saltatrix	1,313	223.1	3.0	3.4	2.7
Spot	Leiostomus xanthurus	1,956	185.9	4.5	2.8	1.5
Hogfish	Orthopristis chrysopterus	1,325	179.2	3.1	2.7	2.2
Sand perch	Bairdiella chrysura	563	71.2	1.3	1.1	2.0
Croaker	Micropogon undulatus	353	65.1	0.8	1.0	2.9
Percent of sample represented by above species				93.9	90.9	

Three nonedible species--menhaden, pinfish, and thread herring--accounted for 79.9 percent of the total sample by weight and 81.2 percent by number of individuals. Five edible species--bluefish, spot, hogfish, sand perch, and croaker--accounted for 11.0 percent by weight and 12.7 percent by number of individuals. The remainder of the long-haul and pound-

net catch consisted of species occurring rather infrequently. Thus, about 80 percent of the catch in this fishery, both by weight and by number of individuals, consisted of nonedible species, just the reverse of the trawl fishery results.

Column 5 shows the size range of the eight species to be 1.5 oz. (spot) to 3.1 oz. (menhaden). Generally, the average individual size appears to be somewhat larger than fish taken by the trawl fishery. Although pinfish contributed considerably less to the total sample weight than menhaden, this species contributed the highest number of individuals. Those species occupying the surface and middle layers of the water, such as menhaden, thread herring, bluefish, and perhaps pinfish, were more evident in the catch than the bottom species such as croaker, sand perch, hogfish, and spot.

SPECIES COMPOSITION OF THE TRAWL CATCH BY MONTH: In table 3 the heaviest contributor to the total trash fish catch, the croaker, contributed consistently throughout the year; in March only 3 percent of the trash fish weight was croaker, but in other months the contribution varied from 17 percent in November to 79 percent in December. The second principal species, spot, was low in December at 2 percent but ranged from 10 percent to 39 percent in other months. Species such as butterfish and longspine porgy contributed relatively large amounts only in two or three months. Still other species like gray sea trout and sand perch owe their consideration as principal species to relatively heavy contributions in one or two months. Some spcies like sand perch contributed less than (<) 1.0 percent of the sample weight in most months of the year.

Table 3 - Species Composition of Industrial Fish Samples from Trawl Fishery in Percent of Weight by Month during Sample Year, February 1962 through January 1963 1/

Species	Jan.	Feb.	Mar.	May	June	July	Sept.	Oct.	Nov.	Dec.
Croaker	53	19	3	52	57	46	45	24	17	79
Spot	10	24	10	17	17	16	14	20	39	2
Butterfish	13	5	23	5	2	2	<1	9	25	<1
Longspine porgy	4	2	<1	<1	6	8	6	17	<1	1
Hogfish	6	8	1	8	3	1	7	9	1	1
Gray trout	1	3	16	4	2	3	3	<1	2	1
Pinfish	<1	<1	5	3	<1	4	2	3	2	<1
Sand perch	<1	16	10	0	<1	<1	0	<1	<1	<1
Clear-nose ray	<1	<1	<1	2	2	2	2	3	2	<1
All other fish	10	21	27	7	6	8	12	12	11	14
Invertebrates	2	2	4	2	5	10	8	2	<1	1
Number of samples	4	4	3	7	12	8	1	5	4	5

1/Samples unavailable in April and August.

When trash fish are being supplied from the shrimp fishery from May through September, the amount of "all other fish" decreases (6-12 percent) and the weight of invertebrates increases (2-10 percent).

THE 1964 SURVEY

It was originally planned that the sample year for 1964 would be February 1964 through January 1965, but owing to stormy weather and little fishing activity, samples were not available in February. Therefore, the sample year extended from March 1964 through February 1965. Since the trawl fishery accounts for 95 percent or more of the industrial fish catch, sampling effort was directed entirely towards this fishery. A total of 82 samples was collected from which 112,493 individual fish, weighing 10,780 pounds, or almost 0.1 percent of the total industrial fish catch were identified and counted.

SPECIES COMPOSITION OF THE CATCH: There were 77 species collected in 1964, and a breakdown by species or groups is presented in table 4. Twelve species listed separately accounted for 83.8 percent by weight and 85.3 percent by number of individuals. Nineteen species, each accounting for less than 1 percent by weight of all samples, are shown collectively to constitute 6.1 percent by weight and 5.7 percent by number of individuals. Forty-six species, each occurring infrequently, combined to constitute 4.6 percent by weight and

8.9 percent by number of individuals. Invertebrates, mostly nonedible crab species, squid, sea-stars, and sand dollars, comprised 5.5 percent by weight of the samples.

The leading four species--croaker, spot, gray sea trout, and butterfish--are edible species accounting for 68.0 percent by weight of the sample. Among the eight remaining individually-named species four--sand perch, hogfish, puffer, and rock sea bass--are edible and combined accounted for 8.6 percent of the weight of the trash fish and 6.1 percent of the number of individuals. Among the 19 species, each accounting for less than 1.0 percent by weight of all samples, eight are edible and contributed 1.9 percent of the trash fish weight and 2.4 percent by number of individuals; of the 46 species occurring but infrequently only three are edible and it was estimated they contributed no more than 0.1 percent of the trash fish weight and 0.3 percent by number of individuals. Thus, 78.6 percent of the total trash fish catch by weight and 81.9 percent by number of individuals were comprised of edible fish species.

Table 4 - Composition of 82 Industrial Fish Samples from 1964 Trawl Fishery in North Carolina, Showing by Species and Categories Number of Individuals Counted, Weight in Pounds, Percent Composition of Samples by Number of Individuals and Weight, and Average Weight of Individuals

Species		No. of Ind.	Wt. in Lbs.	% Comp. by No.	% Comp. by Wt.	Avg. Wt. Ind. (Oz.)
Common Name	Scientific Name					
Croaker	Micropogon undulatus	33,841	3,262.2	30.1	30.3	1.5
Spot	Leiostomus xanthurus	19,170	1,742.2	17.0	16.2	1.5
Gray trout	Cynoscion regalis	7,241	1,215.8	6.4	11.3	2.7
Butterfish	Poronotus triacanthus	22,062	1,104.6	19.6	10.2	0.8
Sand perch	Bairdiella chrysura	3,184	415.1	2.8	3.8	1.1
Longspine porgy	Stenotomus caprinus	4,866	339.1	4.3	3.2	1.1
Hogfish	Orthopristis chrysopterus	2,025	215.1	1.8	2.0	1.7
Puffer	Sphaeroides maculatus	875	181.1	0.8	1.7	3.3
Clear-nose skate	Raja eglanteria	176	176.4	0.2	1.6	16.0
Filefish	Monocanthus hispidus	593	132.6	0.5	1.2	3.6
Pinfish	Lagodon rhomboides	1,250	128.7	1.1	1.2	1.6
Rock sea bass	Centropristes philadelphicus	807	114.6	0.7	1.1	2.3
19 species, each accounting for less than 1.0% by weight		6,405	661.0	5.7	6.1	-
46 species, occurring infrequently		9,998	495.3	8.9	4.6	-
Invertebrates		-	596.7	-	5.5	-
Totals		112,493	10,780.5	99.9	100.0	-

Column 5 in table 4 provides an estimate of the average size of individual fish. Although gray sea trout placed third among principal species by weight they were relatively large individuals (2.7 oz.) and ranked fourth in percentage of number of individuals. Butterfish, ranking fourth in percentage of weight, was quite small in average size (0.8 oz.) and ranked third in percentage by number of individuals.

The small size of the individuals comprising the bulk of the catch indicates that the industrial fishery depends upon young-of-the-year fish.

SPECIES COMPOSITION OF THE CATCH BY MONTH: The dominant species, croaker, contributed quite consistently throughout the year with low contributions only in February (8 percent) and April (5 percent) (table 5). Spot, the second ranking species, had low contributions in three months. The next two species, gray sea trout and butterfish, contributed heavily to the trash fish in only 6 months of the year or less. Other species made significant contributions in only a few months and rock sea bass owed its appearance in the list to a 17-percent contribution in February. Those 12 species account for a low of 48 percent of the catch by weight in February and a high of 96 percent in April. In the warmer months when shrimping operations were supplying trash fish there was evidence of a decline in the amount of "all other fish" and in the same period (June through September) an increase was apparent in the amount of "invertebrates".

SUMMARY AND CONCLUSIONS

It appears to be characteristic for an industrial fish fishery to depend upon relatively few species for the bulk of the catch by weight. Thus, in the industrial fish fisheries of New

Table 5 - Species Composition of Industrial Fish Samples from Trawl Fishery in Percent of Weight by Month during Sample Year, March 1964 through February 1965[1/]

Species	Jan.	Feb.	Mar.	Apr.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Croaker	20	8	30	5	47	43	39	47	25	24	18
Spot	11	5	28	7	22	21	30	11	13	15	1
Gray trout	19	0	15	43	6	1	2	4	1	21	31
Butterfish	10	<1	7	21	7	5	3	4	23	24	7
Sand perch	9	<1	3	0	<1	<1	0	1	<1	1	25
Pinfish	<1	<1	<1	<1	<1	<1	1	<1	7	<1	<1
Longspine porgy	<1	<1	2	0	2	8	<1	3	6	<1	4
Hogfish	11	6	1	<1	<1	<1	<1	1	1	<1	<1
Puffer	2	<1	2	20	<1	<1	<1	2	2	1	2
Clear-nose ray	2	9	<1	0	2	<1	<1	1	2	2	2
Filefish	<1	1	<1	0	<1	<1	<1	4	2	<1	4
Rock sea bass	1	17	<1	0	<1	<1	<1	<1	<1	<1	0
All other fish	12	42	9	3	7	9	12	11	10	7	3
Invertebrates	1	10	2	0	5	11	11	10	7	3	1
No. of samples	10	4	8	2	10	11	6	6	9	9	7

1/Samples unavailable in May.

England (Edwards and Lux 1958; Edwards 1958), Gulf of Mexico (Haskell 1961), and California (Best 1959), about 75 percent or more of the catch was provided by three or four species. Similarly in North Carolina in 1962 and 1964, four species supplied 73 and 68 percent, respectively, of the catch by weight.

In most studies of industrial fish fisheries, information concerning the number of individual fish sampled is not considered. Snow (1950) sampled the catch of one boat according to number of individuals, but Best (1959) counted and measured individual fish to determine length composition of the catch by species. In the North Carolina study individual fish were counted to establish species composition of the catch in percentage of number of individuals and to provide an estimate of size of individual fish. In each year of study four species are shown to account for 75 and 73 percent of the catch by number of individuals.

The New England fishery (Edwards and Lux 1958) is based upon nonedible fish or edible fish used on occasion. The Gulf of Mexico fishery is based principally upon croaker and spot, but in that area those species are not considered desirable as food fish (Haskell 1961). In California the fishery is based upon two nonedible species and one species of limited use as food (Best 1959). In the North Carolina fishery in 1962, three edible species constituted 67.5 percent of the catch by weight and a total of 17 edible species accounted for 79.7 percent. In 1964, four edible species contributed 68 percent of the catch by weight and a total of 19 edible species contributed 78.6 percent. The catch depends on those edible species to a slightly greater extent on the basis of number of individuals than on weight.

Thus the North Carolina industrial fish fishery differs from those previously reported in that marketable fish form the source of supply. However, it must be noted that all trash fish are caught merely incidental to regular fishing operations. Whether trash fish is processed into marketable byproducts or shoveled overboard, the trash fish are dead or dying. Further, individuals of all edible species are indicated to be young-of-the-year, and among such, natural mortality could be expected to be high.

The small size of fish comprising the bulk of the catch as shown in the last column of tables 1 and 4 indicates strongly young-of-the-year individuals. In general the fish of 1964 are slightly smaller than those of 1962.

Economic factors can influence the make-up of trash fish according to species and size. For example, if small gray sea trout (weakfish) as marketable food fish have temporarily glutted the market, the next catch of small trout would be routed to a dehydrating plant and processed into meal. This action "increases" the amount of an edible species in the trash fish and also tends to increase the average individual size of the species.

In monthly contributions to the industrial fish catch those species contributing most to the total catch by weight apparently contribute consistently throughout the year. Some im-

portant contributors make significant contributions in only 6 months or even fewer. Some species contribute heavily to the trash fish in only 1 month of the year. When trash fish are being supplied from the winter trawl fishery (October through March), there appears to be a greater amount of trash fish contributed by "all other fish" and a lesser amount by "invertebrates."

In 1962, the differences in species composition and average individual size between catches from the trawl and the long-haul and pound-net fishery are shown in tables 1 and 2. The trawls catch primarily edible fish of small size but the long-haul seines and pound-nets catch mostly nonedible species of larger size. Interestingly enough the heaviest contributor to the trawl catch, croaker, is one of the least important in the other; conversely, menhaden which hardly appears in the trawl fishery is the main species in the long-haul and pound-net fishery and at the same contribution level (43 percent) as croaker was in the trawl fishery. In this study the differences between these two gear fisheries have little significance because 95 percent or more of the trash fish is supplied by trawlers. However, these differences should be noted to serve as guides for future studies involving different types of fishing gear

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Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

THE SOUTH PACIFIC LONG-LINE FISHERY FOR ALBACORE TUNA, 1954-64

By Tamio Otsu*

ABSTRACT

This report presents a brief history and the present status of the South Pacific tuna long-line fishery based in American Samoa. From a modest beginning with a fleet of only 7 Japanese long-line vessels, this fishery has grown steadily, and by 1963 it comprised about 100 vessels from Japan, Republic of Korea, and the Republic of China. The annual landings of albacore tuna, the principal species caught, increased from 744,500 pounds in 1954 to 30 million pounds in 1963. The catch declined in 1964 to 23.5 million pounds, owing to the combined effects of a decrease in catch per effort and a drop in fishing effort. Preliminary analysis suggests that the entrance of a strong year-class in early 1964 has contributed in large part to the decline in catch (by weight) per unit of effort in 1964.

In 1949, a small cannery was built on the north shore of Pago Pago Bay, Tutuila Island, American Samoa. Except for two trial runs, the cannery was never operated, owing to the failure of attempts to supply it with tuna by live-bait fishing and purse seining in the surrounding waters. The U. S. Department of the Interior subsequently purchased the plant and offered the cannery for lease. In 1953, a California tuna-packing firm bid for and obtained a lease on the plant with an option to renew it. (Van Campen 1954. "Tuna fishing at American Samoa, January-April 1954.") This transaction marked the beginning of the tuna fishery in American Samoa and the beginning of a South Pacific long-line fishery for albacore. In January 1954, seven Japanese tuna vessels began long-line fishing around American Samoa to supply tuna to this cannery. In 1963, a second California tuna-packing company began canning tuna in American Samoa.

Starting with a modest fleet of 7 long-liners in 1954, the operation grew steadily and by the latter part of 1958, a total of 30 long-line fishing vessels was based at American Samoa. The number of vessels reached a peak in 1963, when about 100 vessels were operating. As of December 1964, a total of 68 vessels was operating in this fishery.

The composition of the fishing fleet, in terms of the country of origin of the vessels, has changed over the years. In the early years of the fishery, the fleet was composed entirely of long-liners from Japan. In 1962, vessels from the Republic of Korea began operating in the area and in 1964, vessels from the Republic of China joined the fleet. The 68-vessel fleet operating in December 1964 was composed of 40 vessels from Japan, 17 from the Republic of Korea, and 11 from the Republic of China.

Because of the very rapid development of this fishery, a data-collecting system was established to monitor the effects of the fishery on the resource. Through the cooperation of Governor H. Rex Lee of the Government of American Samoa, the Samoa Department of Agriculture and the tuna-processing industries, a field station was established in April 1963. Manned by personnel from the U. S. Bureau of Commercial Fisheries Biological Laboratory Honolulu, Hawaii, the field station is effective not only in conducting biological sampling of catches, but also in obtaining catch and operational data from vessel operators who deliver their catches to the canneries. This report is partially based on data obtained through this field station.

The geographical expansion of the fishery is illustrated in figure 1. At the outset of the fishery in 1954, the vessels fished relatively close to American Samoa in an area of approximately 100,000 square miles. By 1956, considerable fishing already took place as far south as latitude 28° S., in waters southeast of the Tonga Islands. The greatest expansion of fishing grounds was in 1958, however, when vessels extended fishing eastward to the vicinity of the

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Note: This article is part of a more comprehensive report being prepared on the American Samoa-based fishery.

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Marquesas Islands. Presently, the vessels are fishing in an extensive area from the Equator in the north to as far south as 30° S., and from about 175° E. longitude in the west to as far east as longitude 120° W., or an area of about 8 million square miles. Vessels fish as far as 3,000 nautical miles from their base.

Except for the first few years, when yellowfin tuna dominated the catch, albacore has been the predominant species in the catch. Albacore tuna are being delivered to the canneries in a ratio of about 4:1 by weight over yellowfin. Among the tunas, albacore usually commands the highest price. In American Samoa, commercial fishermen have geared their effort towards catching that tuna species. Fishing grounds are selected where albacore are most plentiful and not necessarily where the greatest aggregate total of tuna of all species can be caught.

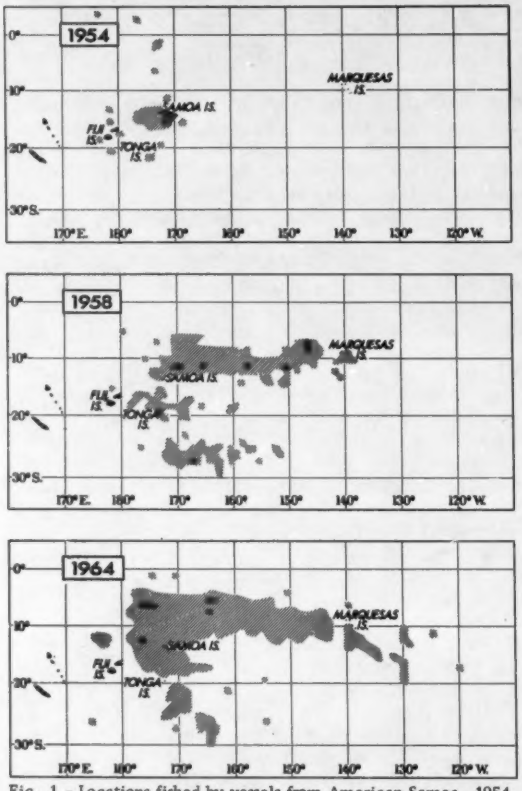

Fig. 1 - Locations fished by vessels from American Samoa, 1954, 1958, and 1964

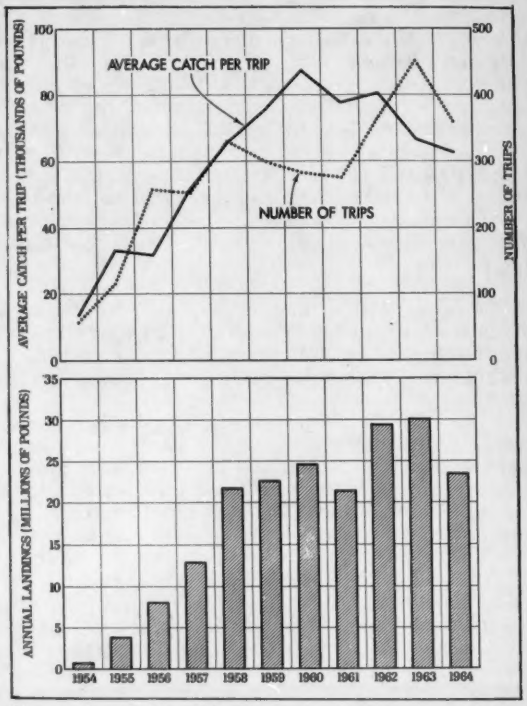

Fig. 2 - Annual albacore landings, annual total number of fishing trips, and average albacore catch per trip by vessels based in American Samoa, 1954-64.

The total annual landings of albacore tuna by vessels based in American Samoa, the total number of fishing trips made each year, and the average catch of albacore per fishing trip are shown in figure 2. (Note: Albacore landings data are based on date of capture rather than on date of delivery and may therefore disagree slightly with other published statistics.) The annual catch of albacore increased steadily since the start of the fishery, from 744,500 pounds in 1954 to 30 million pounds in 1963. In 1964, the catch declined to 23 million pounds. In general, the annual landings have tended to fluctuate according to fishing effort (number of trips). Between 1958 and 1960, however, landings increased despite a decrease in fishing effort. The rise was due to an increase in the average catch per fishing trip (a more refined measure of effort is not available prior to 1962). The rather sharp drop in landings in 1964 resulted from the combined effects of a decrease in average catch per fishing trip and a drop in fishing effort.

An analysis of available data from American Samoa indicates that catch per unit of effort, in terms of numbers of albacore taken per 100 hooks fished, has not shown any upward or downward trend during 1963 and 1964. On the other hand, the weight of albacore landed per 100 hooks declined significantly in 1964 (fig. 3). The decline was largely due to a decrease in mean size of fish taken by the fishery in 1964 as compared to 1963 and earlier (fig. 4).

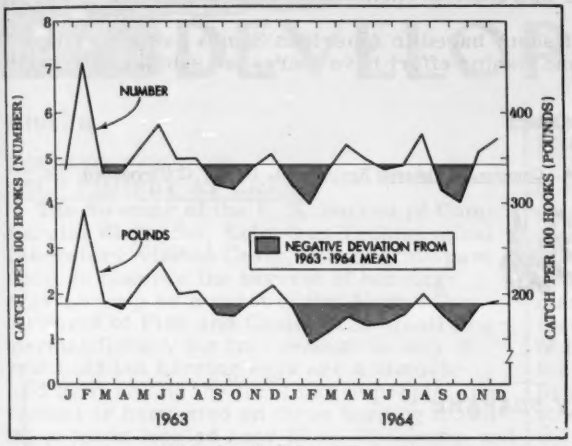
NUMBER
POUNDS
NEGATIVE DEVIATION FROM 1963-1964 MEAN
CATCH PER 100 HOOKS (NUMBER)
CATCH PER 100 HOOKS (POUNDS)
J F M A M J J A S O N D J F M A M J J A S O N D
1963
1964

Fig. 3 - Catch per 100 hooks of albacore, in numbers and in weight, for 1963 and 1964, from data of vessels based at American Samoa.

The available data indicate that the catch of albacore tuna has decreased in recent years, mostly in terms of weight of fish taken per unit of fishing effort. The decrease in mean sizes of albacore in 1964 was due to a complete change in size composition from 1963. The very smallest fish available to the fishery increased sharply (albacore under 85 centimeters or 33.5 inches in length numbered an estimated 9,045 in 1963 and 88,509 in the 1964 catches) and the numbers of the largest fish decreased (63,183 fish larger than 100 centimeters or 39.4 inches in 1963, but only 35,273 in 1964). In other size categories, fish between 86 and 90 centimeters (33.9 to 35.4 inches) increased greatly from 101,299 in 1963 to 214,826 in 1964, while fish between 91 and 100 centimeters (35.8 to 39.4 inches) decreased from 606,586 to 307,908.

Although changes in sex ratio, as well as shifts in fishing grounds, could greatly affect the mean sizes of fish taken (the average weight of male albacore is 4 to 10 pounds more than that of females; size of albacore in the South Pacific increases progressively from the Equator to around latitude 25° S.), the data for 1963 and 1964 indicate that those factors played only a small part in the size decrease of 1964. The proportion of male albacore tuna decreased only slightly from 64.3 percent of the sampled fish in 1963 to 62.1 percent in 1964. Similarly, the fishing effort in the area between latitude 15° S. and latitude 25° S., where the albacore are the largest, decreased slightly from 15.4 percent of total fishing trips in 1963 to 12.1 percent in 1964.

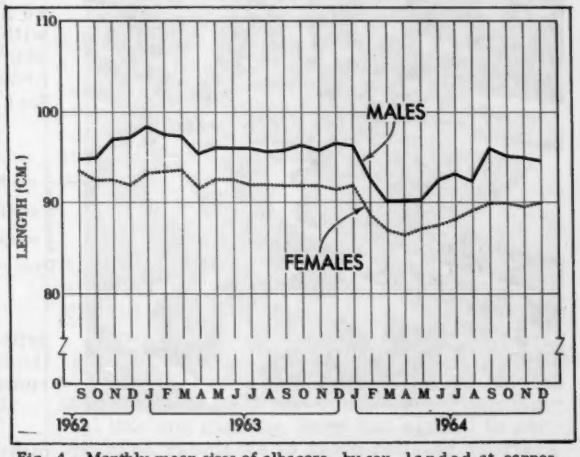

Fig. 4 - Monthly mean sizes of albacore, by sex, landed at canneries in American Samoa, September 1962 to December 1964.

It appears that the decline in catch rate, in terms of weight of albacore taken per unit of effort, has resulted primarily from (1) some presently unexplainable movement of larger fish away from the areas of the fishery, particularly during February-May 1964, and (2) the entrance into the fishery in early 1964 of an abundant year-class. A preliminary analysis of the data suggests that the strong year-class contributed in large part to the decline in catch (weight) per unit of effort. If so, it may be expected that the catch (weight) per unit of effort will rise in subsequent seasons as the large year-class passes through the fishery.

This report is based largely on data collected at the field station established in American Samoa, and covers only the operations of the Samoa-based vessels. A considerable amount of

Japanese fishing effort is expended in the South Pacific which has not been considered in this study, at least partly because of the unavailability of data. Also, conclusions based solely on data from the relatively small American Samoa-based fishery (various estimates place its relative effort in the South Pacific at from 20 to 60 percent and variable from year to year) may not be entirely valid. To overcome this objection, South Pacific data from other sources are being incorporated where possible in the more comprehensive study being made.

In summary, the history of the long-line fishery based in American Samoa has been one of steady growth. The catch, area of fishing, and fishing effort have increased substantially over the years.

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HEARTY SEAFARE

HEARTY SEAFARE

12 (4 ozs. each) frozen, raw, breaded fish portions	$\frac{1}{4}$ cup melted fat or oil
	$\frac{3}{4}$ teaspoon paprika

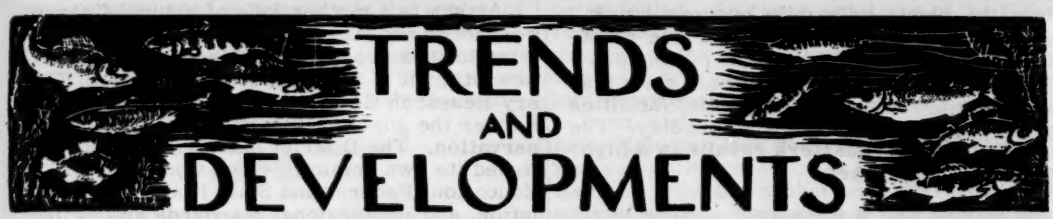
Place frozen, raw, breaded portions in a single layer on well-greased cooky sheets, 15 x 12 inches. Pour fat over fish. Sprinkle with paprika. Bake in an extremely hot oven, 500° F., for 10 to 15 minutes or until fish is brown and flakes easily when tested with a fork. Serve with Egg Sauce. Serves 6.

EGG SAUCE

$\frac{1}{4}$ cup butter or margarine	2 cups milk
$\frac{1}{4}$ cup flour	2 hard-cooked, eggs, chopped
$\frac{1}{4}$ teaspoon salt	2 teaspoons chopped parsley
Dash pepper	2 teaspoons lemon juice

Melt butter; blend in flour, salt, and pepper. Gradually add milk and cook until thick and smooth, stirring constantly. Add remaining ingredients; heat. Serves 6.

This recipe developed by home economists of the Bureau of Commercial Fisheries is from a 19-page, full-color, cookery booklet (Top O' the Mornin' with Fish and Shellfish, Test Kitchen Series No. 16) recently released by the Bureau of Commercial Fisheries, U. S. Department of the Interior. For 25 cents you can buy a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20240.



Alaska

HERRING-EGGS-ON-KELP FISHERY AT CRAIG:

The director of the U. S. Bureau of Commercial Fisheries, Ketchikan Technological Laboratory visited Craig, Alaska, this past April to observe the harvest of herring-eggs-on-kelp as a guest of the Alaska Department of Fish and Game. The small commercial fishery for that product is only 8 years old but herring eggs are a historic food item among the local native people. The product is harvested on three herring spawning grounds located near Sitka, Hydaburg, and Craig. The Alaska Department of Fish and Game has set a quota of 225 tons on the harvest. Approximately 100 tons were harvested at Craig where 17 processors, 600 pickers, and 350 boats participated in the 90-minute season. For the most part these were from Southeastern Alaska; but one vessel, the Fred D. Parr, and her crew of 28 were chartered from Seattle. The fishery yielded about 350 pounds of herring-eggs-on-kelp per fisherman worth about $150 for 90 minutes of work. The product consists of $\frac{2}{3}$ to $\frac{4}{5}$ herring eggs by weight and is said to normally sell for about $2 a pound in Japan but that the price reached $12 a pound during the year-end holidays.

* * * * *

DENMARK IMPORTS ALASKAN FISHERY PRODUCTS:

The United States Embassy in Denmark recently published a report on Danish imports of fishery products. The report stated that king crab, shrimp, and salmon accounted for most of the imports from the United States in 1965. All the king crab and much of the shrimp and salmon were of Alaskan origin. The sharp rise in king crab and shrimp imports by Denmark during the past few years was attributed to special marketing efforts.

* * * * *

LOGGING AND SALMON PROBLEMS DISCUSSED:

Mutual problems arising from the effects of the expanding logging industry in Alaska on salmon resources were discussed at a Juneau meeting between regional officials of the U. S. Bureau of Commercial Fisheries and a corresponding staff from the U. S. Forest Service management and research divisions. Summarized information was exchanged on the status of the salmon projects conducted by both services in Alaska. The need for more attention to those problems was brought into focus and it was agreed that a much increased liaison will be organized in Alaska between the Federal and state agencies concerned.

* * * * *

INTEREST IN SEWARD'S FISHERIES POTENTIAL:

A former Seward resident, who is engaged in the general investment and import business in Seattle, discussed with U. S. Bureau of Commercial Fisheries exploratory fishing personnel the possibilities for a bottomfish processing plant in Seward. The Seattle businessman heads a group of local investors anxious to put Seward back into the fishing industry.

* * * * *

NAVY TO RELEASE DUTCH HARBOR BUILDINGS FOR HOUSING NEEDS AT UNALASKA:

Senator Bartlett announced in his April 7, 1966, Washington Report, that certain facilities at the U. S. Navy Department's Dutch Harbor station would be made available for commercial use and that the Navy has agreed to permit area residents to move housing quarters from the base for reconstruction on civilian property.

There are 4 permanent and 3 floating shellfish-processing plants at Unalaska. Each operation employs between 35 and 125 persons.

While the plants primarily process crab, there are plans to expand at least one plant into processing shrimp, ocean perch, and other fish species. Local officials state that inadequate housing and commercial facilities are holding back growth of the industry. The absence of family quarters results in a high turnover of employees.

* * * * *

NEW FISH-PROCESSING PLANTS AT KOTZEBUE AND GOLOVIN:

The Small Business Administration (SBA) has approved a $350,000 loan to an Anchorage firm for the construction of fish-processing plants at Kotzebue and Golovin. The funds will also be used for the purchase of 2 tender boats and 2 floating fish-dressing stations. The loan, being made to the Anchorage Development Corporation, will create an estimated 24 new jobs.

* * * * *

NEW VESSEL FOR KING CRAB FISHERY:

A new crab vessel, the Peggy Jo, stopped in Ketchikan this past April for fuel and a brief visit on her maiden voyage to Kodiak. This is the first new vessel designed and built specifically for the Alaskan king crab industry. She is 100 feet long, 28 feet wide, has a draft of 12 feet, and cost near $300,000. Several other new crab vessels are now under construction.

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FISHERY SCIENTISTS ORGANIZE:

Alaska now has its own district organization of the American Institute of Fishery Research Biologists. Elected to head up the new organization of professional scientists were: T. R. Merrell, Bureau of Commercial Fisheries, U. S. Department of the Interior, as director; W. H. Noerenberg, Alaska Department of Fish and Game, as vice director; and W. L. Sheridan, U. S. Forest Service, as secretary-treasurer.

The parent organization has over 400 members, mostly in the United States, although some live in Europe, South America, Asia, and Africa. The goals of the Institute are to advance the theory and practice of fishery science by biologists and fishery managers and to maintain high standards among fishery scientists by recognition of achievement and by adherence to a code of professional ethics.

Alaska is a mother lode of natural fishery resources and there are many problems related to those resources. Members of the new District of the American Institute of Fishery Research Biologists hope that they may further the goals of fishery science and conservation. The District has already established its own committees on Conservation Education, Federal and State Fishery Legislation, and Professional Standards among fishery biologists.

Alaska Fisheries Explorations and Gear Development

SHRIMP BEHAVIOR-TRAP STUDIES COMPLETED:

Two months of shrimp behavior trap studies at Little Port Walters were completed this past April by staff members of the U. S. Bureau of Commercial Fisheries. Information gained was being put to immediate use in modifying shrimp pots for spring field operations.

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VESSEL CHARTERED FOR SHRIMP EXPLORATIONS:

The fishing vessel Little Lady of Petersburg, chartered by the U. S. Bureau of Commercial Fisheries, began a 54-day cruise in April 1966 for shrimp exploratory fishing and gear research. Activities will be concentrated in the southern part of Prince of Wales Island, particularly the Cordova Bay area.

Alaska Fisheries Investigations

SALMON EGG SURVIVAL RATES MAY BE IMPROVING:

Pending more complete information which will not be available until the persistence of excessive ice and snow on Olsen Creek is gone, the survival of salmon eggs in the post-earthquake intertidal zone may be showing signs of improving. Based on samples taken in April 1966, the overwinter survival rates of both pink and chum salmon eggs in the upper intertidal zone was considerably higher than for the first year after the earthquake in 1965. Further, the upper intertidal 1966 survival rates were similar to the pre-earth-

quake rates based on samples in the spring of 1964. While the zones are similar with respect to the tide, they occupy different locations because of the earthquake. The present upper intertidal zone is essentially the old middle or lower tidal zone.

American Fisheries Advisory Committee

21ST ANNUAL MEETING HELD IN WASHINGTON, D.C.:

The 21st annual meeting of the American Fisheries Advisory Committee was held May 9-10, 1966, in Washington, D. C. The Committee was addressed by Secretary of the Interior Stewart L. Udall. Text of the address by the Interior Secretary follows:

"It is again my pleasure to welcome the American Fisheries Advisory Committee to Washington. It is also gratifying to see that the excellent attendance continues through the 21 meetings held by this Committee since it was organized in 1955. This fact speaks well for your great interest and your willingness to assist the Department in deliberating the problems of the United States commercial fishing industry. I look forward to receiving your advice and recommendations for their solution.

"In scanning the agenda for this meeting, I note discussions dealing with the quality of the environment in which we live; international competition for fisheries resources; and current developments in respect to Fish Protein Concentrate. These topics are very timely, and are of vital importance to each of us as individuals; to the Nation as a whole; and to the world-wide struggle to which the United States is irrevocably committed.

"I especially share the concern of Dr. Cain (Assistant Secretary of the Interior for Fish and Wildlife and Parks), over the deteriorating quality of the environment in which we live. As you know, one of my main interests in very recent years has been in the conservation and management of water. Of all the natural resources presently known to man, undoubtedly the most abused is water. So long as streams could cope with the load of wastes, we were content to let them struggle along. Suddenly, the load has become too much. Even our salt water estuaries and certain coastal ocean waters are being fouled. As representatives of the fishing industry, you are aware of the consequences which follow the deterioration of spawning and nursery areas for such important commercial species as shrimp, oysters, salmon, and menhaden. Anyone flying over Lake Erie can look down and see the cloudy mess of pollution which is killing much of the fish and plant life of that once sparkling clear body of water. The scene is like looking at the flyleaf of a book on the end of civilization. If we are unable to turn our great material wealth into saving our great natural wealth, then our prospects are indeed grim. It is not a situation we can dismiss--the piper is waiting to be paid.

"In recognition of our water resource problems, the 88th Congress passed the Water Resources Research Act on July 17, 1964. On that same date, an Office of Water Resources Research was established within the Department of the Interior. The purpose of this Act is to stimulate and sponsor programs of research and to promote the training of scientists capable of dealing with water problems. The program, within one year, stimulated establishment of water resources research institutes in each of the 50 States and the Commonwealth of Puerto Rico. Some of the projects initiated in the first year have dealt with the use and management of water for outdoor recreation, fish and wildlife, and other similar uses to which limited attention had been given.

"In addition, on July 22, 1965, President Johnson signed into law the Water Resources Planning Act--a history making piece of legislation designed to encourage conservation, development, and use of water and related land resources on a comprehensive and coordinated basis by the Federal Government, States, municipalities, and private enterprise. It also established the Water Resources Council, of which I am proud to be the chairman. The first task of the Council has been to study the serious drought condition in the Northeast, and to make recommendations for alleviating it in all possible ways.

"As the chief executive of this Nation's resource agency, I have dedicated myself to the conservation of all of our natural resources, both on land and in the sea. This goal is shared with me by many likewise dedicated members of this Department, some of whom are with us at this moment.

"Today we face a grave and subtle conservation challenge. I invite you--the key representatives of an industry which depends upon our valuable natural resources of the sea for its existence--to join me in meeting this challenge."

Note: See Commercial Fisheries Review, July 1965 p. 18.

California

1966 ANCHOVY REDUCTION FISHERY CLOSES:

Landings in the California anchovy reduction fishery totaled 16,436 tons through April 28, 1966, according to the California Department of Fish and Game. That fishery closed for the season on April 30 when a total of 17,051 tons had been taken--substantially below the authorized quota of 75,000 tons.

The taking of anchovy for straight reduction was approved in October 1965, by the California Department of Fish and Game which established the season as from October 15 to April 30 of each year, with a quota of 75,000 tons for the fishery. The California Department of Fish and Game also created five fishing zones and established quotas for each as: Zone 1 (Point Conception to Port Hueneme) 10,000 tons; Zone 2 (from Port Hueneme on the North to Dana Point on the South and reaches out to sea as far as Catalina Island) 10,000 tons; Zone 3 (Dana Point to the Mexican border) 10,000 tons; Zone 4 (the entire open ocean area west of Catalina and the Santa Barbara Islands) 35,000 tons; and Zone 5 (from Point Conception North) 10,000 tons.

Regulations adopted by that State's Fish and Game Commission stipulated that in areas South of Point Conception, no anchovy reduction fishing was allowed within three miles of the mainland shore or the mainland side of Catalina Island. Regulations also provided that the fishery in any zone shall terminate if the zone were to reach its quota before the overall season ends but provided that five days notice be given to terminate the fishery in any given zone.

During the 1966 season, landings were well below the established quotas for all zones except Zone 2 where the quota of 10,000 tons was reached before the season's end and the zone closed at midnight April 26. The quota in Zone 2 was exceeded by 2,480 tons due to heavy landings between April 21, when the legally required 5 days notice of closure was given, and the time when the fishery actually closed. That zone proved highly productive and was the focal point of the reduction fishery largely because of its proximity to the majority of the fishing fleet and processing plants.

Note: See Commercial Fisheries Review, June 1966 p. 7.

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PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 66A-1-Pelagic Fish (March 14-19, 1966): The coastal waters of southern California from San Clemente Island to Port Hueneme were explored during this cruise by the California Department of Fish and Game research vessel Alaska.

Objectives of the cruise were to: (1) survey the spawning population of Pacific hake (Merluccius productus) to determine density and distribution; (2) gain experience in midwater trawling for this species; and (3) test proposed new equipment, and monitor midwater trawl performance by electronic means.

California Department of Fish & Game research vessel Alaska.

This survey was originally planned as a 4-week joint effort with the research vessels John N. Cobb and David Starr Jordan, Bureau of Commercial Fisheries, U. S. Department of the Interior. The Jordan was to survey for hake eggs and larvae and monitor the midwater trawl performance of the other two vessels. The Alaska and Cobb were to midwater trawl for spawning hake in areas where eggs were most abundant.

However, due to unanticipated repairs, the Jordan could not participate and the egg and

larvae work was limited to a brief survey by the vessel Alexander Agassiz of Scripps Institution of Oceanography. Further, the Alaska was delayed because of her annual overhaul and joined the Cobb only during the final week. The reduced survey located no areas of concentrated spawning, and no spawning hake were taken.

Although no adult hake were found, a school of juveniles was located and sampled by the Cobb in Santa Monica Bay. Those fish were 80-130 fathoms from the surface in a submarine canyon that was 150 to 250 fathoms deep. The school was broken into small groups and extended for at least 2 miles in length but less than ½ mile in width. Midwater trawling on that school by the Alaska was ineffective because the fish were too deep for the vessel's net-depth telemetering equipment.

Considerable experience was gained in operating equipment for fish occurring at deep levels. Through combined operations with the Cobb, it was learned how hake appear on the echo-sounder and what adjustments are required to record them at 80 to 140 fathoms. Observations were made of the Cobb's commercially-oriented operations which uses gear considerably larger than on the Alaska.

Echo-sounding for hake detected many schools of anchovies. The Precision Depth Recorder was operated for 337 miles and recorded 373 schools. The schools were distributed over most of the area traversed and included considerable numbers 20 or more miles offshore. Most schools appeared as small "plumes" on the recorder occurring at 5-40 fathoms beneath the surface. Attempts to sample those fish were unsuccessful because of clear water and "flighty" fish. One mixed catch of anchovies and several species of bottom dwelling forms was made in shallow turbid water at Port Hueneme.

A Hach Turbidimeter (model 1720) was tested for measuring sea-water turbidities. Results indicate it is suitable for use at sea although the absolute range of turbidities in Jackson turbidity units is quite small.

Trial plankton tows were made to determine the suitability of the Alaska for egg and larvae surveys; no problems were encountered.

Note: See Commercial Fisheries Review, March 1966 p. 19.

Cans--Shipments for Fishery Products, January-February 1966

A total of 239,907 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-February 1966 as compared with 414,359 base boxes used during the same period in 1965.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area of 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.
Source: U. S. Department of Commerce, Bureau of the Census.

Caribbean and Tropical Atlantic Fisheries Explorations

FISH PUMP TESTED IN CARIBBEAN FISHERIES:

M/V "Oregon" Cruise 107 (February 15-April 1, 1966): To initiate field studies on the application of fish pumps to harvest anchovies, herring, and sardine-like fish was one of the several objectives of this cruise in the Lesser Antilles between Puerto Rico and Trinidad. Secondary objectives by the exploratory fishing vessel Oregon of the Bureau of Commercial Fisheries, U. S. Department of the Interior, were to: (1) determine seasonal distribution and relative abundance of swordfish and tuna; (2) survey the fishery potential of Dominica, W. I., in cooperation with the Smithsonian Institution and the United Nations Special Fund Caribbean Fisheries Project; and (3) collect zoogeographic data for developing resource potential estimates.

Extensive observations were made on the attraction of small schooling fishes to night lights and their susceptibility to capture with an experimental 6-inch (1,500 g.p.m.) fish pump. A total of 17 nights was devoted to the studies at the locations covered. Submerged 1,000-watt lights were used in combinations of from 1 to 4 units with precise intensity control. Species showing direct positive response to various light intensities included Anchoa lyolepis, Anchoviella eurystole, Jenkinsia sp., Membras sp., Harengula clupeola, H. humeralis, and Chirocentrodon bleekerianus, all of which appeared in dense concentrations at various times during the observations. Species showing indirect positive response in-

Areas investigated during cruise 107 of the M/V Oregon (February 15-April 1, 1966).

cluded Opisthonema oglinum, Decapterus punctatus, Trachurus sp., and several other carangids. All of the latter species exhibited some degree of susceptibility to fish-pump capture. In addition, incidental captures of larger fish included miscellaneous flying fishes (avg. $\frac{1}{4}$ pound each) and large cutlassfish (2 to 3 pounds each). Highest sustained catch rates were made at Grenada where in 1 hour 234 pounds of anchovies and sardines were pumped. Samples of the most abundant species were sun-dried and sent to the Bureau's Technological Laboratory for composition analysis. Results of the first series of analyses follow:

Species	Area	Protein	Oil	Water	Ash
		(Percent)			
Jenkinsia sp. (1")	British Virgin Islands	61.9	7.9	12.5	17.7
Jenkinsia sp. (3")	St. Lucia	34.1	7.8	15.7	42.4
Membras sp.	British Virgin Islands	68.1	9.5	13.6	8.8
Membras sp.	Dominica	66.6	4.8	15.7	12.9
Anchoa lyolepis	Anguilla Island	40.3	7.4	14.5	37.8
Harengula clupeola	Dominica	36.3	6.2	29.2	28.3

Long-line sets of 500 to 600 hooks were relatively uproductive. A nighttime set off Antigua yielded a single 78-pound swordfish. A daylight set east of St. Lucia yielded 5 blackfin (Thunnus atlanticus). The combined bill-

fish catch for all sets was one spearfish (Tetrapterus sp.) and one marlin (Makaira sp.). Additional species caught included 11 whitetip sharks (average 160 pounds), barracuda (Sphyraena barracuda), snake mackerel (Gempylus sp.), and lancetfish (Alepisaurus sp.). Three sharks were tagged and released in cooperation with American Institute of Biological Sciences (AIBS) tagging studies and samples of flesh and liver were frozen from the remaining catch for analysis by Bureau technologists.

Deep-set lines of 41 hooks each were equipped with magnesium anchor releases and fished in 200 fathoms off Dominica and in 400 fathoms off St. Lucia. The Dominica set surfaced on schedule with a catch of 2 small sharks. The St. Lucia set failed to surface.

Species caught while trolling between stations were: 25 dolphin (Coryphaena hippurus and Coryphaena equisetis) average 12 pounds each, 4 skipjack tuna (Katsuwonus pelamis) average 4 to 19 pounds, 3 little tuna (Euthynnus alletteratus), 4 blackfin tuna (Thunnus atlanticus) average 8 pounds each, 1 wahoo (Acanthocybium solanderi) 37 pounds, 13 great barracuda (Sphyraena barracuda), 1 king mackerel (Scomberomorus cavalla) 23 pounds, 2 Spanish mackerel (Scomberomorus maculatus), and 1 cero (Scomberomorus regalis). Stomach contents and gonads of tuna and mackerel were preserved for the Bureau's Tropical Atlantic Biological Laboratory. Of unusual interest was a juvenile mola (Ranzania sp.) which was found in a dolphin's stomach.

Eight surface-tuna schools were seen between Puerto Rico and Tobago and identified as blackfin and skipjack tuna. Attempts to sample those schools by trolling from both the skiff and the Oregon were unsuccessful.

Fourteen trawl and 28 dredge stations were made on limited grounds in the vicinity of Anguilla, Antigua, Dominica, St. Lucia, and Tobago. Catch rates of brown shrimp (Penaeus brasiliensis) in 30 to 40 fathoms off Tobago ranged from 5 to 16 pounds (heads on) per hour with a 40-foot trawl. Shrimp varied from 11-15 to 26-30 count. Catches in this depth range were dominated by grunt (Haemulon melanurum) 4 per pound. Grunt and small vermilion snapper (Rhomboplites aurorubens) were filleted and frozen for taste tests by the Bureau's Branch of Marketing Test Kitchen at Pascagoula. Deep-water shellfish of potential commercial value caught in 250 to 450 fathoms off Dominica included scarlet prawns (Plesiopenaeus edwardsianus)--17 pounds per hour (heads on), striped shrimp (Plesionika longipes), Penaeopsis megalops--12 pounds per hour, and lobsterettes (Eunephrops bairdii) and Nephropsis rosea). Dredging operations throughout the survey area were unproductive due to heavy accumulations of limestone rubble and rock.

Hand-line catches off Dominica, St. Lucia, Grenada, and Tobago were low and included 1 silk snapper (Lutjanus vivanus) 2 pounds, 4 croaker (Ophioscion sp.) $\frac{1}{2}$ pound each, 1 southern tilefish (Caulolatilus sp.) 2 pounds, 2 yellow-edge grouper (Epinephelus flavolimbatus) 10 pounds each, 1 warsaw (Epinephelus nigritus) 12 pounds, and several wenchman (Pristipomoides sp.) 1 to 2 pounds each.

Note: See Commercial Fisheries Review, January 1966, p. 23.

Central Pacific Fisheries Investigations

FORECAST FOR SUMMER 1966 HAWAIIAN SKIPJACK TUNA FISHERY:

The skipjack tuna (aku) fishermen of Hawaii, who had their best year in history in 1965, are probably not going to fare as well in 1966, according to scientists of the U. S. Department of Interior's Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, who predict whether the summer 1966 skipjack tuna catch will be average or above average.

The Bureau's Honolulu Laboratory oceanographer, who has been preparing the skipjack forecasts for 10 years, says that 1966 promises to bring "below average landings, as did 1960." The annual average skipjack catch from 1948 through 1965 has been 10 million pounds. The catch in 1960 was 7.4 million pounds, 2.6 million pounds below the long-term average and less than half the record high catch of 16 million pounds in 1965.

The forecast is based on the time of the year when the surface water at Koko Head begins to warm up. When the water warms up in February and when "favorable" water of low salinity bathes the islands during the summer, the skipjack catch increases.

The laboratory scientist says, "We have found that two environmental indicators can be related to better than average fishing. The first is when the change of winter cooling of the surface water to spring warming occurs in February rather than in March. The second is when waters bathing the islands during the fishing season have a salinity of less than 34.8 parts per thousand. The first index, since it occurs in February or March, is of predictive value with respect to the main skipjack season during the summer months. This year the initial warming of the water took place in March and therefore indicates a fishing season with below average availability of skipjack tuna." The fact that the water warmed late, he points out, does not necessarily preclude favorable low salinity water from entering the islands region during the spring. However, he says, "As of March 31, Koko Head salinities have not yet begun their seasonal decline. In the 10 years since 1956, this has occurred only twice. That was in 1957 and 1960, when salinities began their decline in early April, The 1957 and 1960 skipjack seasons were both below average. Both 1957 and 1960 followed years with well above average catches. The forecast for 1966 therefore is for below average landings, as in 1960."

The scientist points out that the physical mechanisms which bring "favorable" water to the islands are unknown and until they are determined, the skipjack forecasts can be of only general value.

According to John C. Marr, the Bureau's director of the Hawaii Area, whenever the fishery differs substantially from the prediction, more is learned about skipjack. In 1965, for example, the fishery was much better than was expected on the basis of the Koko Head data. It turned out that during 1965 the catch of skipjack per unit of bait used was much greater than had been the case for any previous year.

Note: See Commercial Fisheries Review, July 1965 p. 19.

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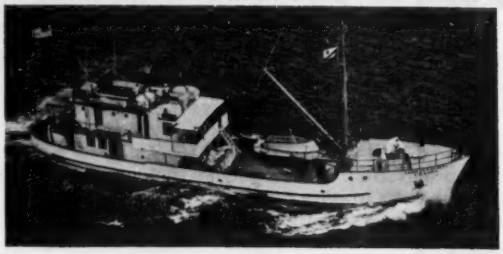
TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 90 (March 31-April 6, 1966): The return of live yellowfin, skipjack, wavyback skipjack, and frigate mackerel to Kewalo Basin for density and red muscle size determination for locomotion and hydrodynamic studies was one of the main objectives of this cruise by the research vessel Charles H. Gilbert, of the U.S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu, Hawaii. The area of operations was within 100 miles of Oahu and Kauai.



Research vessel Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries.

Other objectives of the cruise were to: (1) collect and return live scombrids to behavior tank facilities for sensory threshold and behavior experiments; (2) return yellowfin that have been chilled in ice for a packing company to determine if blood streaks in cooked fish can be avoided; (3) collect blood samples for subpopulation analysis (Subpopulations Program) of skipjack in the Hawaiian Islands; (4) collect fresh samples of fish eye lenses and brains for enzyme studies; and (5) acquaint sea scouts with data collection at sea and seamanship.

Densities from 2 yellowfin and 1 skipjack that were returned live to Kewalo Basin were determined but scombrids of desired species and size were not caught for red muscle size determination. A total of 8 wavyback skipjack was returned live to behavior tank facilities, 10 yellowfin were returned to the packing company, 5 of which were chilled in ice and 5 were bled and chilled, 75 skipjack blood samples were collected and chilled, and eye lenses and brains of 2 dolphin and 5 wavyback skipjack were collected.

Thermograph and barograph were operated continuously during the cruise and the usual standard watch for fish, birds, and aquatic mammals was maintained.

Trolling lines were out continuously between Kewalo Basin and each fishing station; total trolling time was 40 hours 50 minutes. Two skipjack (Katsuwonus pelamis), 11 wavyback skipjack (Euthynnus affinis), 18 yellowfin (Thunnus albacares), 3 dolphin (Coryphaena hippurus) and 1 wahoo (Acanthocybium solan-

dri) were caught. Ten weather stations and 10 bathythermograph stations were made.
Note: See Commercial Fisheries Review, June 1966 p. 11.

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NEW SONAR GEAR INSTALLED ON RESEARCH VESSEL "TOWNSEND CROMWELL":

A research vessel of the U. S. Bureau of Commercial Fisheries Biological Laboratory in Honolulu, Hawaii, is undergoing acceptance trials of special electronic equipment designed to reveal facets of fish behavior never known before.

Biologists agree that the central Pacific Ocean holds uncaught stores of tuna, one of the most valuable of the food fishes. A recent estimate says that at least 150,000 tons of a single species, the skipjack tuna, could be taken without harming the stock. That would about equal the entire U. S. catch of all species of tuna, and the tuna landings in dollar value are the third most important in the country.

But these tuna inhabit an area of some 30 million square miles, about 10 times the size of the continental United States. They are only rarely seen. Where and how they can be located depends on aspects of tuna behavior scientists have been unable to study until now.

The Bureau has installed on the research vessel Townsend Cromwell, operated by its laboratory in Honolulu, a new device that is expected to provide scientists with fresh clues for the finding and catching of the subsurface tunas. The device is a continuous-transmission, frequency-modulated (CTFM) sonar.

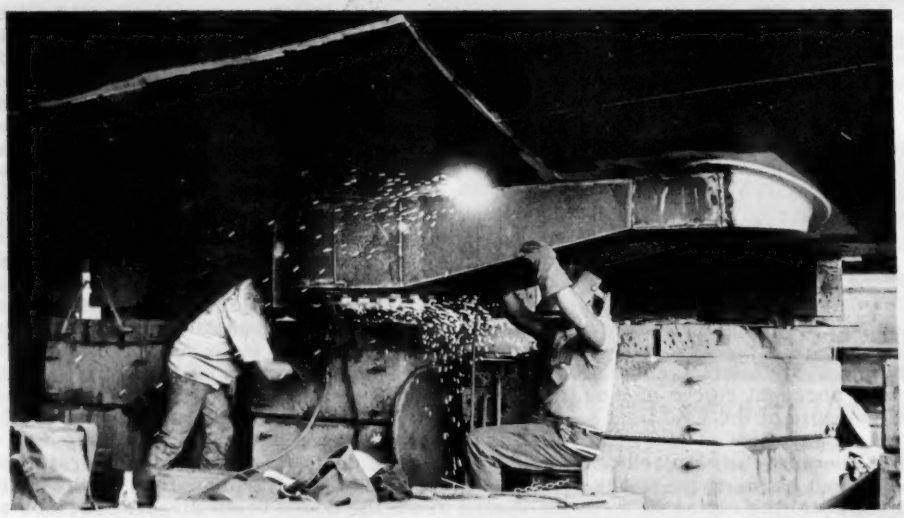
Sonar (from SOund NAvigation and Ranging) is a method of locating underwater objects by the sound they reflect. It is the underwater equivalent of the more familiar radar, but whereas radar uses radio waves, sonar uses sound waves, for sound waves travel great distances under water and radio waves do not.

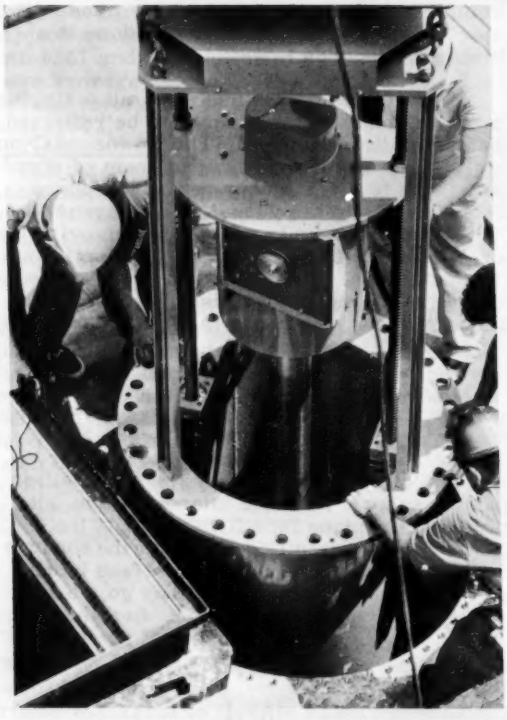
The sonar consists of two principal elements. The first of these is a set of retractable transducers located in the bottom of the vessel. When in use, they are extended 5 feet beneath the keel. The sonar emits a continuous beam of high-frequency sound. When this sound strikes an object with a density different from water, a fish, for example, an echo is returned. The second principal element of the sonar is the console, which is a large metal cabinet installed in the "sonar room" of the Townsend Cromwell. When an echo is returned to the transducer, it appears as a point of light on a cathode ray tube (like the screen of a television set); simultaneously it also produces a sound which can be heard through earphones. The operator can determine how far the object is from the ship, in what direction, and approximately how deep it is. Normally, searching is done automatically. In the search mode, he can detect skipjack tuna schools as far as 2,000 feet from the ship; a high resolution mode provides for a more detailed examination of objects within 400 feet of the ship.

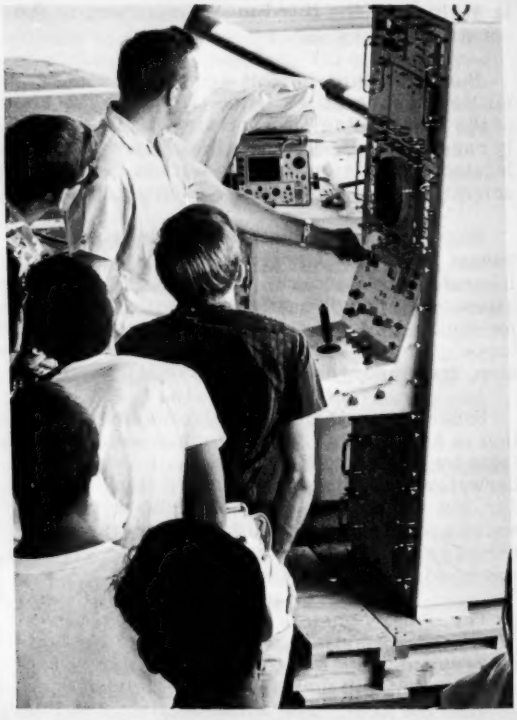
The transducer can sweep a complete circle or it can play on a small segment of a circle, depending on how the operator sets the controls. It can operate in any position from the sound beam directed horizontally to it directed vertically. Thus it can search a complete underwater hemisphere whose diameter is 0.8 mile. This can be done in a matter of seconds

Most sonars now in use send out a single pulse of sound and wait for it to be reflected before emitting another. The Townsend Cromwell sonar emits a continuous beam of sound and there is a continuous return of echoes from targets to the vessel. This means that the sonar can keep track of a fast-moving fish or school. This feature is called Continuous Transmission. The Townsend Cromwell sonar is frequency modulated, like FM radio. For these reasons, the sonar is often referred to as a CTFM sonar.

Installed early in April 1966 (see photographs on page 22), the sonar was being "debugged" and undergoing tests before acceptance. If it operates according to standards, its first use will be to study the composition of tuna schools near the island of Oahu, site of a large surface tuna fishery. It is the intention of the scientists operating the sonar to determine how tightly the subsurface tunas are schooled, to what depths they go, their speed, and how far they range. Such information can then form the basis of studies and experiments and gear with which to catch the fish.







A new sonar to track tuna schools in the central Pacific Ocean has been installed aboard the research vessel Townsend Cromwell of the Bureau of Commercial Fisheries Biological Laboratory, Honolulu. Top, workmen cut hole in bottom of ship to allow installation of a retractable shaft which carries the transducers. Bottom left, transducer shaft is lowered into place. Bottom right, engineer stands at console explaining working of sonar to technicians who will use it.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, MARCH 1966:

Fresh and Frozen: The Armed Forces are a major buyer of fresh and frozen fishery products. Purchases of fresh and frozen fishery products for the Armed Forces in March 1966 totaled about 2.8 million pounds with a value of $1.9 million. This represents an important market for the U.S. fishing industry.

Table 1 - Principal Fresh and Frozen Fishery Products Purchased by Defense Personnel Support Center, March 1966 with Comparisons

Product	March 1966 Qty. Lbs.	March 1966 Avg. Cost ¢/Lb.	March 1965 Qty. Lbs.	March 1965 Avg. Cost ¢/Lb.	Jan.-Mar. 1966 Qty. Lbs.	Jan.-Mar. 1965 Qty. Lbs.
Shrimp:						
raw headless	30,150	116	92,400	98	174,380	276,800
peeled and deveined	87,164	152	165,500	141	214,264	319,660
breaded	440,500	105	326,500	88	956,367	929,920
molded and breaded	75,780	68	60,650	66	104,680	155,900
Total shrimp	633,594	107	645,050	101	1,449,691	1,682,280
Scallops	337,750	49	217,304	85	864,250	538,884
Oysters:						
Eastern	65,852	128	68,718	97	161,756	207,490
Pacific	82,880	90	35,426	80	121,430	97,652
Total oysters	148,732	107	104,144	91	283,186	305,142
Fillets:						
Cod	18,850	42	41,520	36	73,150	156,270
Flounder	343,100	48	178,050	38	970,300	802,500
Ocean perch	321,500	42	313,500	34	1,309,100	1,008,290
Haddock	199,600	47	183,550	37	584,100	455,550
Haddock portions	357,538	51	188,504	47	824,926	498,054
Steaks:						
Halibut	103,200	59	113,770	51	300,300	322,420
Salmon	9,610	70	18,250	64	41,547	32,740
Swordfish	-	-	400	62	500	1,260

In March 1966 purchases of fresh and frozen fishery products for the Armed Forces were up 9.8 percent in quantity and 16.7 percent in value from the previous month. The increase was due mainly to larger purchases of shrimp, scallops, oysters, flounder fillets, and haddock fillets and portions.

Table 2 - Fresh and Frozen Fishery Products Purchased by Defense Personnel Support Center, March 1966 with Comparisons

QUANTITY				VALUE			
March		Jan.-Mar.		March		Jan.-Mar.	
1966	1965	1966	1965	1966	1965	1966	1965
(1,000 Lbs.)				($1,000)			
2,780	2,272	7,534	6,678	1,917	1,550	4,824	4,326

Compared with the same month in the previous year, purchases in March 1966 were up 22.4 percent in quantity and 23.7 percent in value. Average prices were generally higher in March 1966 as compared with the same month in 1965.

Canned: Purchases of canned tuna, and sardines in March 1966 were down considerably as compared with a year earlier.

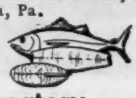
Table 3 - Canned Fishery Products Purchased by Defense Personnel Support Center, March 1966 with Comparisons

Product	QUANTITY March 1966	QUANTITY March 1965	QUANTITY Jan.-Mar. 1966	QUANTITY Jan.-Mar. 1965	VALUE March 1966	VALUE March 1965	VALUE Jan.-Mar. 1966	VALUE Jan.-Mar. 1965
	(1,000 Lbs.)				($1,000)			
Tuna	-	1,548	821	2,189	-	650	466	941
Salmon	8	2	2,069	8	5	2	1,382	7
Sardine	21	35	232	146	11	20	129	89

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than shown because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, June 1966 p. 14.

Source: U. S. Department of Defense, Defense Personnel Support Center, Philadelphia, Pa.



Fisheries Laboratory

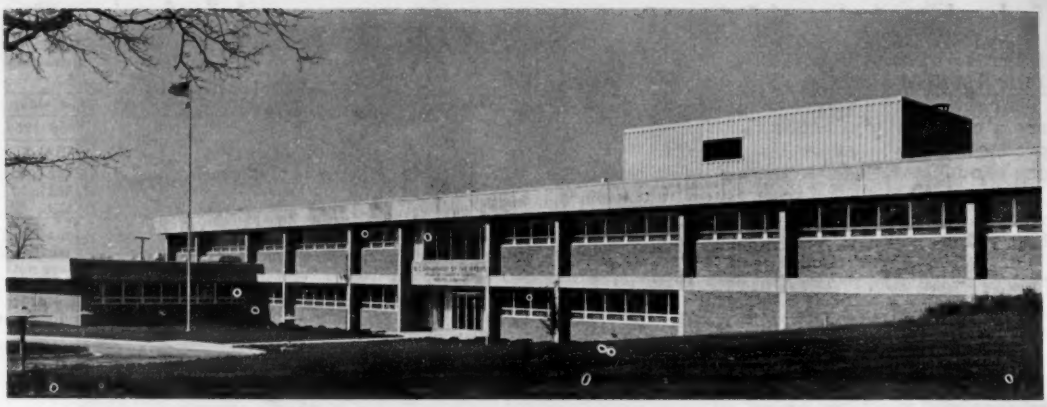
NEW RESEARCH LABORATORY FOR BUREAU OF COMMERCIAL FISHERIES DEDICATED IN MICHIGAN:

Dedication ceremonies were held May 12, 1966, at the new Fisheries Research Laboratory in Ann Arbor, Mich., to be operated by the Bureau of Commercial Fisheries of the U. S. Department of the Interior.

Dr. Stanley A. Cain, Assistant Secretary for Fish and Wildlife and Parks was the principal speaker. Other speakers included United States Representative Weston E. Vivian of Michigan; Harold E. Crowther, Deputy Director, Bureau of Commercial Fisheries; Mayor Wendell E. Hulcher of Ann Arbor; and Dr. Harlan Hatcher, President of the University of Michigan.

The new $1.4 million center on the North Campus of the University of Michigan houses about 60 researchers and supporting staff. The scientists are engaged in biological, technological, and statistical studies primarily related to lake, river, and reservoir fisheries of the United States. Research is conducted in cooperation with the various States of the Bureau's Great Lakes and Central Region. Among the major studies are sea lamprey research and control, lake trout rehabilitation, pollution, and pesticide control, irradiation of fishery products, and industrial product development.

The new laboratory also houses the technical editorial staff serving all Bureau biological laboratories, and is headquarters for the secretariat of the Great Lakes Fishery Commission, which includes members from Canada and the United States.



A view of the new Fisheries Research Laboratory building in Ann Arbor, Michigan, to be operated by the Bureau of Commercial Fisheries of the U. S. Department of the Interior.

In his remarks, the Assistant Secretary said he knew of no better location for a fishery research station than Ann Arbor. He cited it as the State of Michigan's fishery research center and the headquarters of the Great Lakes International Commission. He also pointed out the aggregation of fishery scientists working in Ann Arbor--technologists, economists, marketing specialists, administrators, and others, and that real cooperation existed among the persons of those various disciplines.

The Assistant Secretary concluded with, "....we wish a bright future to this laboratory that is being dedicated today. It joins a group of distinguished laboratories on the Atlantic, Gulf, and Pacific coasts. But we have more than a hopeful wish before us. In my opinion, this laboratory will become distinguished for its fundamental researches, for the cleverness of its technological applications to fish management and the industry, for its good judgment and balance, and for its vision."

Concurrent with the dedication ceremonies was acceptance of the John Van Oosten Great Lakes Fishery Research Library, also located in the new laboratory building. The late Dr. Van Oosten participated in some of the earliest continuing fishery research on the Great Lakes and was Director of the Bureau's first laboratory in the Great Lakes area.

Great Lakes

MICHIGAN STREAMS STOCKED WITH YOUNG SILVER (COHO) SALMON:

Approximately 225,000 young silver (coho) salmon were released in mid-May 1966 in the Big Huron River, Baraga County, Mich., to conclude the Michigan Conservation Department's first-year plantings of the fish in 3 northern Michigan streams.

The 5- to 6-inch fish were planted above Big Erick's Bridge east of Skanee. Earlier in the spring, some 600,000 other silver salmon were stocked in the Platte River, Benzie County, and Bear Creek, Manistee County. Many of the fish planted in the latter 2 streams have made their way into the Great Lakes. These silver salmon, along with those now swimming down the Big Huron River, carry the Michigan Conservation Department's hopes for revitalizing fishing in the Great Lakes and connecting streams.

If the program progresses as planned, the young salmon will grow for about two years in the Great Lakes and then return to the rivers for spawning in fall 1967.

As part of the planting program in the Big Huron River, also liberated were 50,000 year-old rainbow trout under an accelerated program to boost steelhead runs in Great Lakes streams. (News Bulletin, Michigan Department of Conservation, Lansing, May 19, 1966.)
Note: See Commercial Fisheries Review, February 1966 p. 18.

* * * * *

FISH BLOCK PRODUCTION OF UNDERUTILIZED FRESH-WATER SPECIES STUDIED:

Fish blocks for the production of fish sticks and portions generally are in short supply and are principally from foreign sources. Blocks likely will remain scarce until underutilized species now available to the domestic fishery can be used. The potential market for fish blocks made from abundant underutilized fresh-water fish appears good. Why not then, simply start catching those fish and making them into fish blocks? This question has to be answered on the basis that there are many problems--technological and economic--that up to now have prohibited the use of underutilized fish for fish-block production.

Investigations are now underway by the U. S. Department of the Interior's Bureau of Commercial Fisheries that are aimed at producing suitable fish blocks from sheepshead and burbot fillets. These studies are being conducted by the Bureau's technological laboratory at Ann Arbor, Mich., in cooperation with processors from the Lake Superior and Lake Erie fisheries.

Sheepshead poses the more difficult task for several reasons--rancid off-flavors develop in the product during frozen storage; sections of dark brownish-red flesh degrades the appearance of the portions; and in some instances, the texture of sheepshead portions is hard and tough. Studies to control those detrimental factors are proceeding quite well. Sheepshead blocks processed under several different conditions, aimed at controlling these factors, are being prepared. The blocks from the studies that appear acceptable for commercial use will be taken to experienced industry members for further evaluation.

Very little is known about the frozen storage characteristics of burbot. Therefore, in addition to investigating the physical and initial quality characteristics of blocks made from burbot, the expected shelf life of frozen portions cut from burbot blocks is being determined.

Great Lakes Fisheries Explorations and Gear Development

LAKE MICHIGAN TRAWLING STUDIES CONTINUED:

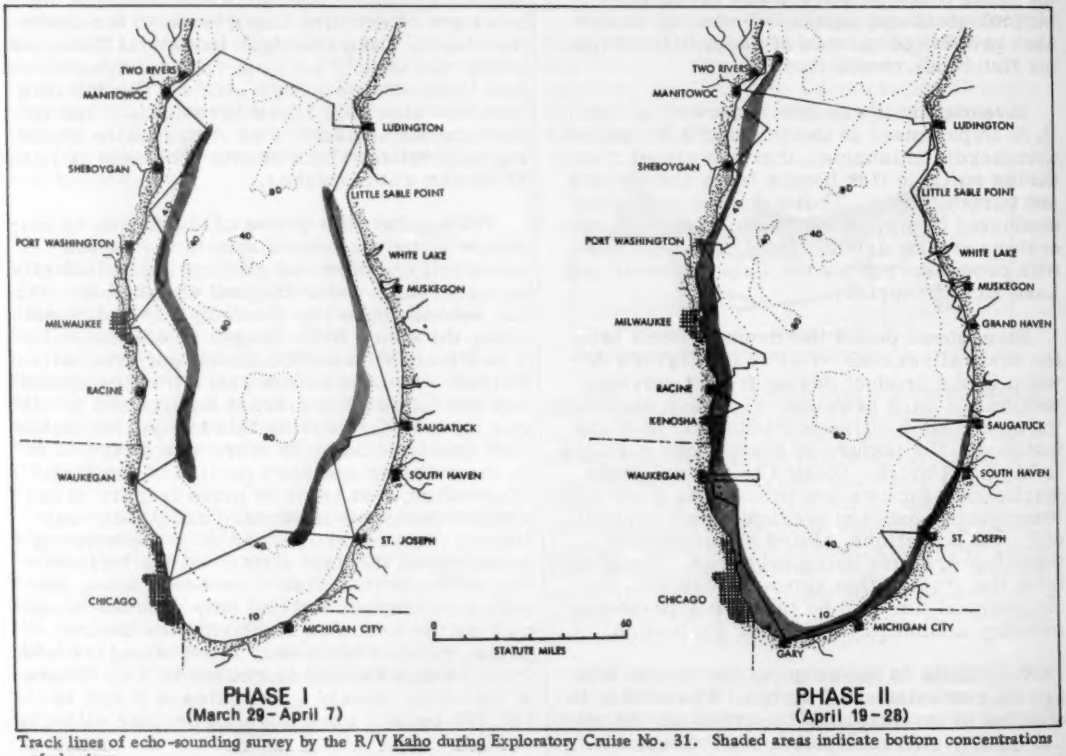
M/V "Kaho" Cruise 31 (March 29-April 28): A 31-day exploratory fishing cruise in Lake Michigan was completed April 28, 1966, by the research vessel Kaho of the Bureau of Commercial Fisheries, U. S. Department of the Interior. The cruise was conducted in two phases to study and document the inshore spawning migration of alewives. The first phase was from March 29 to April 7 and the second phase from April 19-28. The survey covered the portions of Lake Michigan from Ludington, Mich., to Two Rivers, Wis., southward. The characteristics and timing of the runs are of extreme importance to the newly developing Lake Michigan industrial fisheries which now supply both pet-food manufacturers and fish-meal reduction plants. The information will also help lakeside municipal and industrial water users cope with alewife spawning migrations which create problems at Lake Michigan water intakes.

During the first phase of the cruise no evidence of the shoreward spawning run was noted and the alewives still characteristically occupied deep water (beyond 45 fathoms). On the second phase the spawning run had begun along the shore from Saugatuck clockwise to Two Rivers (the northernmost port visited). Evidence from previous years that the spawning run follows a northeast lag in Lake Michigan was verified during this study; that is, the fish appear to begin to move shoreward first in the extreme southern portion of the lake. Thereafter, fish begin to move inshore at successive locations northward and appear earlier on the west shore than at corresponding locations on the east shore. At the termination of the cruise, fish were heavy along the entire west shore but had only reached Saugatuck on the east shore. During the second phase, catches were very heavy along the lake from Benton Harbor clockwise to Two Rivers. In that area, hourly catch rates of 6,000 to 180,000 pounds were made at or near all ports visited.

FISHING OPERATIONS: Exploratory drags were made at various locations around the lake where heavy alewife concentrations were observed on the echo-sounder or to verify the absence of alewives at certain depths or particular locations. Two drags (off Saugatuck) were made to capture chub for technological studies. A total of 32 drags was completed, 10 during Phase I and 22 during Phase II. Drags were of various lengths with on-bottom time periods ranging from 1 minute to 30 minutes. Drags made in areas holding large concentrations of alewives were shortened to less than the standard 30-minute period to avoid making large catches. Major gear damage resulted from sets in some areas--in the piers at Manitowoc, at 8 fathoms off Two Rivers and at 6 fathoms off Port Washington.

FISHING RESULTS PHASE I (March 29-April 7): During Phase I there was no evidence of the beginning of the spawning run anywhere in the southern half of the lake. Alewives were completely lacking in all harbors visited and in shallow waters. The best landings and echo-sounder recordings of alewives were made in 45-50 fathoms from Saugatuck south along the east shore and along the west shore south of Port Washington. Alewives were not positively located off Manitowoc. Severe weather prevented a thorough survey along the east shore between Little Sable Point and Saugatuck. The best landing was 1,500 pounds in a 30-minute drag at 44 fathoms off Benton Harbor.

FISHING RESULTS PHASE II (April 19-28): From just north of Benton Harbor around the southern portion of the lake to Waukegan, dense scattered schools were located along the beaches in 6-9 fathoms and heavy concentrations were found in all harbors. Commercial trawlers fishing just in front of the Benton Harbor piers were landing up to 9,500 pounds in 10-minute drags. The Kaho made large catches at all stations and particularly in the harbor of Gary, Ind., where an



Track lines of echo-sounding survey by the R/V Kaho during Exploratory Cruise No. 31. Shaded areas indicate bottom concentrations of alewives.

estimated 6,000 pounds were caught during a 3-minute drag and off Chicago where 1,200 pounds were taken in 2 minutes. Soundings also showed dense fish concentrations in the harbors of Benton Harbor and Michigan City.

From Kenosha to Port Washington heavy concentrations were also recorded in all harbors. Drags in the harbors of Kenosha and Port Washington yielded large catches of alewives. In the open lake off those ports the bulk of the alewife had not yet reached the beaches and heaviest concentrations were found at 15-19 fathoms. Commercial trawlers fishing off Kenosha in 18-19 fathoms were catching 11,000 to 12,000 pounds per hour drag. A large catch estimated at 5,000 pounds was made at 15 fathoms off Port Washington. Alewife apparently had not yet reached the harbors or beaches from Sheboygan to Two Rivers where they were found to be highly concentrated from 27-29 fathoms. The Kaho landed 1,600 pounds in a 15-minute drag at the same depth off Two Rivers. Commercial trawlers in that area were making comparable landings.

Along the east shore from Ludington to Holland, alewives were virtually absent in the harbors and along the beaches. Weather prohibited excursions into deep water to search for alewife concentrations between Little Sable Point and Saugatuck. The absence of alewife off Ludington has been noted before during the same time of the year. Scattered fish (possibly alewives) were sounded at mid-lake in mid-water at about 50 fathoms.

Phase II started and ended at Saugatuck, Mich. Alewives were not found at any depth off Saugatuck on April 19; however, by the end of the cruise on April 28, heavy schools were concentrated in front of the piers in $3\frac{1}{2}$ to 4 fathoms where commercial trawlers were making good catches. At all locations where alewives were heavy, virtually no other fish were taken and only 2 yellow perch were taken during the entire cruise.

The Kaho, departed from the Saugatuck vessel base May 3, 1966, on a 24-day exploratory fishing cruise in Lake Michigan, including Green Bay. This cruise, the first of two 24-day surveys, covering the entire lake was primarily concerned with completing knowledge concerning the seasonal availability of alewife and chub stocks to bottom trawl fishing gear at specific monitoring locations in Lake Michigan and Green Bay. This information, particularly that on alewife, will be important to the newly developed Lake Michigan industrial fisheries supplying pet food manufacturers, and fish-meal reduction plants. The commercial production of Lake Michigan alewife increased from a mere 400 pounds in 1956 to nearly 15 million pounds in 1965. The future potential size of this fishery appears to be at least ten times this amount.

Note: See Commercial Fisheries Review, April 1966 p. 26.

Great Lakes Fishery Investigations

BIOLOGICAL RESEARCH AND SEA LAMPREY CONTROL, APRIL 1966:

Some of the highlights of Great Lakes biological research during April 1966 by the Biological Laboratory at Ann Arbor, Mich., operated by the Bureau of Commercial Fisheries, U. S. Department of Interior.

Sea Lamprey Control: Electric barriers in 13 of the 16 Lake Superior tributaries were in operation by April 8. The Misery River and Firesteel River barriers were activated by April 13. Miners River weir is generally placed in operation in early May. The total catch of sea lampreys at the end of the month was 125 compared to 23 a year earlier. Sea lampreys were taken in 8 streams with the Two Hearted River contributing 91 of the total catch. The 3 index barriers on tributaries of northern Green Bay were operating by April 4. A total of 25 sea lampreys were taken by April 29. The Ocqueoc River barrier located in northern Lake Huron near Hammond Bay was placed in operation March 21, and 23 sea lampreys were captured by the end of the month.

Chemical treatment of lamprey-producing streams was confined to southern Lake Michigan and northern Lake Huron. Blue Creek, a tributary stream in the St. Joseph River system, was treated successfully with TFM during the last week in April. Pretreatment surveys of northern Lake Huron streams scheduled for initial treatment were well underway by the end of the month and the treatment crew had preliminary preparations in progress. A comprehensive survey of Lake Michigan streams scheduled for treatment along the west shore failed to disclose sea lamprey ammocetes in the State of Wisconsin. A num-

ber of small streams in Green Bay treated four years ago also showed a lack of reestablished populations.

Lake Michigan Research: The Bureau's research vessel Cisco completed its first cruise of the season on April 16. Collections of alewives and chubs were obtained to provide material for the alewife experiments and pesticide studies. Following the cruise, the vessel was taken to drydock at Sturgeon Bay, Wis., where the hull was sandblasted and repainted.

Experiments on the interrelationship of alewives with yellow perch and smelt were initiated. Mature yellow perch held at the laboratory for an egg supply spawned successfully. Although the yearling alewives held in the laboratory did not eat the perch eggs, they readily ate the newly hatched larvae. Adult smelt and smelt eggs also were acquired. Alewives fed on both the eggs and the young smelt fry. In addition, rainbow trout eggs are being held for hatching. This species initially will serve as a substitute for lake trout to permit preliminary investigations to get underway.

Lake Superior Research: All contract fishermen hired by the Bureau of Commercial Fisheries in the biological sampling of lake trout in Lake Superior began fishing their grounds in April except one fisherman on Isle Royale. The inshore waters along the east shore of Keweenaw Peninsula produced good fishing. The fishing offshore of the Huron Islands was less than a year ago. Scarring by sea lampreys was lower except in Keweenaw Bay where fresh wounds were twice as numerous as a year earlier. In the Marquette area, scarring was down by 30 percent.

The Bureau's research vessel Siscowet began operating on Lake Superior during the final week of the month. A 4-day cruise in Minnesota waters of Lake Superior in cooperation with the University of Minnesota covered the herring grounds north of Duluth. Tow nets were used to sample larval fish populations. Larval fish were readily captured and many were still in the yolk-sac stage. Bottom trawling also was carried out on the herring grounds with coregonid species occuring predominantly in the catches.

Lake Erie Research: The spring sampling of the commercial landings of yellow pike (walleyes) and yellow perch was completed during the month. Over 1,000 of each species were examined at the south shore ports. Data also were collected for comparative fecundity studies of both species in each of the three basins of Lake Erie. Samples of fish for studies of pesticide residues in fish flesh were collected and shipped to the Bureau's laboratory in Ann Arbor.

The research vessel Musky II carried out routine operations in the western basin of Lake Erie in April--servicing thermographs and experimental sediment collectors located in strategic areas. Preliminary trawling was carried on to determine winter mortality rates in fish populations.

Note: See Commercial Fisheries Review, January 1966 p. 35, and February 1966 p. 19.

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CHEMICAL TREATMENT OF SEA LAMPREY-PRODUCING STREAMS CONTINUED:

With the State of Michigan Conservation Department's approval, the U. S. Department of the Interior's Bureau of Commercial Fisheries resumed in late April 1966, its chemical war on sea lampreys in Michigan streams still harboring the eel-like killers. About 60 tributaries of Lakes Superior, Michigan, and Huron are on the Bureau's list for treatment through the end of June 1967.

Final applications of chemicals in 2 streams in Michigan and several Indiana streams will complete the first round of treatments in lamprey-producing tributaries of Lake Michigan.

Starting in late April, the Bureau hoped to mount its first all-out offensive against lampreys in Lake Huron streams where 48 rivers and creeks are scheduled for treatment within the next 3 or 4 years.

A total of 16 streams are scheduled for first treatment this summer and 2 are on tap for their second application of chemicals.

On Lake Michigan, where streams were still too high for chemical work to begin in late April, the Bureau planned to re-treat 27 streams which had re-established sea lamprey populations.

Starting in the summer of 1966, chemical treatment will again be applied to 19 Lake Superior streams, 15 in Michigan and 4 in Wisconsin.

"Planned re-treatment of the Great Lakes tributaries does not mean that earlier work was a failure," said the scientist in charge of the Bureau's sea lamprey control program. "Actually, we've scored heavily on the sea lamprey in our first round of chemical releases and now we're going back to some of these waters with hopes of knocking out lamprey populations which have become re-established," he explained.

Latest studies indicate that lamprey numbers in previously treated Lake Superior streams have been reduced by 80 percent over the last 4 years.

The most encouragement of the lamprey control program comes from evidence of natural reproduction among lake trout in Lake Superior. Noteworthy, too, are signs of high survival among hatchery-reared lake trout planted in Lake Superior.

In Lake Michigan, where treatment work started later than in Lake Superior's streams, it appears that fishery workers also have been successful in reducing the sea lamprey. The Bureau has high hopes that its follow-up treatments in Lake Michigan streams will have the same results now showing up in Lake Superior.

Note: See Commercial Fisheries Review, June 1965 p. 21.

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GREAT LAKES SEA LAMPREY TAGGING PROGRAM:

In a notice to members of the Great Lakes commercial fishing industry, the regional office of the U. S. Bureau of Commercial Fisheries at Ann Arbor, requested all fishermen to be on the alert for tagged sea lampreys. The recovery of tags from sea lampreys will provide valuable information to aid in further reducing the numbers of that parasite in the Great Lakes. Anyone catching a sea lamprey with a tag attached is requested to send the tag, information as to date, size of the lamprey, exact location, and method of capture to the Bureau of Commercial Fisheries, U. S. Department of the Interior, P. O. Box 640, Ann Arbor, Mich., or to the Fisheries Research Board of Canada, Biological Station, Ships Canal Post Office, Sault Ste. Marie, Ontario, Canada.

The sea lampreys are being marked with 2 conspicuous tags. The first type consists of 2 colored disks fastened by a nickel pin to the back of the animal. The second tag is a plastic tube which is passed through the back of the lamprey and joined to form a circle. Markings on the tag provide biologists with the date and location where the sea lamprey was tagged. Persons returning tags will receive an acknowledgment with information on movement and growth of the sea lamprey from which the tag was taken.

Biological data obtained from the tag returns will provide valuable information on the life history and movements of sea lampreys in the Great Lakes. This information is needed to evaluate the success of the chemical program to control the sea lamprey.

Gulf Fisheries Explorations and Gear Development

SHRIMP GEAR STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 64-Phases II, IV, VI, and VII (February 21-May 6, 1966): A 42-day exploratory cruise off the southwestern coast of Florida, Tampa to Key West, was completed May 6, 1966, by the U. S. Department Interior, Bureau of Commercial Fisheries' exploratory fishing vessel George M. Bowers.

The Bureau's exploratory fishing vessel George M. Bowers.

The cruise objectives were: (1) initial field testing of a prototype electroshrimp

trawling system to determine the functioning capabilities, reliability and ruggedness of its components; (2) underwater photography of the electroshrimp trawling system; and (3) photographic recording of the escape reaction of electrically-stimulated shrimp from the Tortugas shrimp grounds.

PHASE II AND PHASE VI--Gear Studies (February 28-March 16, and April 11-26, 1966): A prototype electroshrimp trawling system designed and built by the staff of the Bureau's Gear Research Unit was completed earlier this year. The system is composed of 4 primary components. They are the power control panel aboard the vessel; a cable, supplying power from the vessel to the trawl; an electric pulsing unit mounted on one of the trawl doors and an electrode array. Voltage is controlled from a variable transformer and is monitored on a meter in the panel. The power supply cable being used for the initial trials is a neoprene coated, 4-conductor American Wire Gauge (AWG) No. 12 cable. Two of the conductors are used for the primary power source, and the other 2 conductors are used to monitor voltage readings. The electrical pulser is encased in a watertight-underwater housing and is attached to one of the trawl doors. The housing is fabricated from polyvinyl-chloride tubing and is designed specifically for the electrical pulser. The electrode array is made up of 5 electrodes, equally spaced ahead of the footrope. Each electrode is a heavy-tinned copper braid which has been slipped over a rope core and then connected to a conductor from the electrical pulser.

During field trials, several faulty components were found and were either replaced immediately or were to be exchanged for parts which were on order. The first material tested for use as electrode wire was not adequate and was replaced. Another difficulty encountered was that the designed voltage peaks were not obtained on a continual basis, indicating either malfunctioning components or possibly underrated internal components in the electrical pulser. Facilities available in the field did not permit the correction of this latter condition and repairs were to be effected in the laboratory.

PHASE IV--Underwater Trawl Studies (March 22-April 5, 1966): Turbid water conditions which spread uniformly over the Tortugas shrimp grounds did not permit the scheduled trawl photography to be carried out. Transmissometer readings indicated underwater visibility was limited to only 6 feet. This would not have permitted the effective detailed photography necessary.

Operational testing was carried out on coral reefs adjacent to the Gulf Stream with the new 400-foot film capacity motion picture camera. The electrically-driven unit with reflex focusing gives the SCUBA-equipped photographer more flexibility and control than other systems available. Although additional counter-balance weight had to be added to the housing, the unit handled well underwater and 800 feet of motion picture footage were taken.

PHASE VII--Shrimp Behavior Studies (April 26-May 6, 1966): Results from previous cruises have indicated the escape reaction of electrically-stimulated shrimp have varied according to the type of substrate in which they are burrowed. Therefore, as a continuation of the shrimp behavior studies, SCUBA divers recorded photographically the escape reaction of shrimp from a hard clay bottom. The sequences were recorded with 900 feet of colored motion picture film. The film will provide information on the electrical stimulation of shrimp on one of the important shrimp grounds in the Gulf of Mexico. Bottom samples were taken from the area for laboratory analysis.

In cooperation with Woods Hole Oceanographic Institute, 240 drift bottles were released in 40 locations off the west coast of Florida.

Note: See Commercial Fisheries Review, January 1966 p. 35 and December 1965 p. 33.

Industrial Fishery Products

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production by Areas, April 1966: Preliminary data as collected by the Bureau of Com-

U. S. Production[1] of Fish Meal, Oil, and Solubles, April 1966 (Preliminary) with Comparisons

Area	Meal	Oil	Solubles
	Short Tons	1,000 Pounds	Short Tons
April 1966:			
East & Gulf Coasts . .	6,017	4,625	1,980
West Coast[2]	3,578	481	1,944
Total	9,595	5,106	3,924
Jan.-Apr. 1966 Total .	20,036	6,623	9,195
Jan.-Apr. 1965 Total .	18,962	11,861	5,606

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.

mercial Fisheries, U. S. Department of the Interior.

* * * * *

Production, March 1966: During March 1966, a total of 911,000 pounds of marine animal oils and 4,806 tons of fish meal was produced in the United States. Compared with March 1965 this was an increase of 253,000 pounds of marine animal oils and

U. S. Production of Fish Meal, Oil, and Solubles, March 1966 1/with Comparisons

Product	Mar. 1/1966	Mar. 1965	Jan.-Mar. 1/1966	Jan.-Mar. 1965	Total 1965
	(Short Tons)				
Fish Meal and Scrap:					
Herring	216	497	309	1,039	12,859
Menhaden 3/	-	-	-	2/	175,838
Tuna and mackerel	3,220	1,925	6,178	5,474	25,410
Unclassified	1,370	732	2,719	1,668	27,984
Total 4/	4,806	3,154	9,206	8,181	242,091
Fish Solubles:					
Menhaden	2/	-	2/	-	74,405
Other	2,752	957	5,271	2,667	23,612
Total	2,752	957	5,271	2,667	98,017
	(1,000 Pounds)				
Oil, body:					
Herring	2/	184	2/	471	8,603
Menhaden 3/	-	-	-	2/	175,368
Tuna and mackerel	458	354	826	844	4,799
Other (inc. whale)	453	120	691	394	6,864
Total oil	911	658	1,517	1,709	195,634

1/Preliminary data.
2/Included in "unclassified" or "other."
3/Includes a small quantity of thread herring.
4/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.
Source: U. S. Department of the Interior, Bureau of Commercial Fisheries.

1,652 tons of fish meal and scrap. Fish solubles production amounted to 2,752 tons--an increase of 1,795 tons as compared with March 1965.

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U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-March 1966: Based on domestic production and imports, the United States available supply of fish meal for the first 3 months in 1966 amounted to 84,557 short tons--18,812 tons (or 18.2 percent) less than during the same period in 1965. Domestic production was 2,260 tons (or 27.6 percent) higher and imports were 21,022 tons (or 22.1 percent) lower than in January-March 1965. Peru continued to lead other countries with shipments of 43,592 tons.

The United States supply of fish solubles during January-March 1966 amounted to 5,714 tons--an increase of 10.1 percent as

U. S. Supply of Fish Meal and Solubles, January-March 1966

Item	Jan.-Mar. 1966	Jan.-Mar. 1965	Total 1965
	(Short Tons)		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	-	1/	175,838
Tuna and mackerel	7,413	5,474	25,410
Herring	309	1,039	12,859
Other	2,719	1,668	39,264
Total production	10,441	8,181	253,371
Imports:			
Canada	10,432	10,076	43,830
Peru	43,592	80,220	209,801
Chile	14,037	2,080	5,651
Norway	22	-	78
So. Africa Rep.	955	500	5,100
Other countries	5,078	2,312	6,206
Total imports	74,116	95,188	270,666
Available fish meal supply	84,557	103,369	524,037
Fish Solubles 2/:			
Domestic production	5,271	2,667	98,017
Imports:			
Canada	378	458	1,488
Iceland	33	-	-
Other countries	32	2,066	3,650
Total imports	443	2,524	5,138
Available fish solubles supply	5,714	5,191	103,155

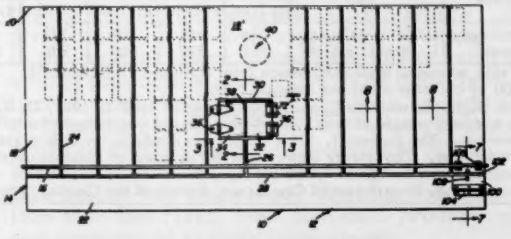
1/Included with "other."
2/Wet weight basis except for imports from South Africa Republic (included in "other countries").
Source: U. S. Department of the Interior, Bureau of Commercial Fisheries, and U. S. Department of Commerce, Bureau of the Census.

compared with the same period in 1965. Domestic production of fish solubles increased 97.6 percent and imports of fish solubles decreased 82.4 percent.

Inventions Patented

LIVE BAIT VENDING MACHINE:

A recently patented live bait vending machine consists of a housing of many storage slots which communicate with a discharge opening. The storage slots hold the containers in which live bait or other items are stored. The vendor is placed on a reservoir of water with an agitator to aerate the water which will keep the bait alive for weeks. A



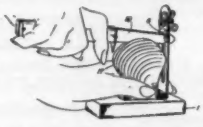
coin-operated dispenser releases one container at a time. Being manually-operated, there is no need for electricity.

The vendor is also adapted for vending other items such as dough bait, worms, fishing tackle, and even frozen bait, food, or cold drinks when placed on a refrigerator unit. The main purpose of the vendor is to have a variety of bait and tackle available for the fishermen at all times of day or night--24 hours a day. (U. S. Patent No. 3,209,884 issued Richard A. Stehling, Sr., Mason Route, Fredericksburg, Texas.)

* * * * *

COMBINED CLAM AND OYSTER OPENER:

A patent was recently granted on an inexpensive combination clam and oyster opener that is simple and rugged. It eliminates cutting of the hands of the operator. All size clams and oysters can be opened simply by raising or lowering the adjustable guide. A working model is available. (U. S. Patent No. 3,231,930 issued Theodore R. Berry, 16 Harriet St., West Orange, N. J. 07052.)



Maine Sardines

CANNED STOCKS, APRIL 1966:

Canners stocks of Maine sardines on April 1, 1966, were down 2,000 cases from those of the same date in 1965, and down 387,000 cases from stocks on hand 3 years earlier.

Preliminary data show the 1965 pack as 1,266,903 standard cases (100 cans 3¾-oz.) canned in 23 plants in Maine. That was 46.3 percent more than the 865,751 cases packed during 1964, when fishing was extremely poor. The 1965 pack was 21.8 percent less than the 1,619,235 cases in 1963.

The 1966 pack of Maine sardines through March 19 totaled 30,651 standard cases, according to the Maine Sardine council. The pack during the same period a year earlier totaled 19,883 cases. Fishing had been limited along the entire Maine coast due to adverse weather conditions.

The new law legalizing year-round canning of Maine sardines removed the traditional December 1 closing date for the packing season. The new legislation opened winter canning to all Maine sardine packers and allows winter canning with domestic as well as imported herring.

Note: See Commercial Fisheries Review, April 1966 p. 28.

Maine

FISHERY LANDINGS, 1965:

Landings of fish and shellfish at Maine ports in 1965 totaled 204.8 million pounds valued at $21.9 million. Compared with 1964, the quantity increased 6 percent, but the value was about the same. Sea herring landings of 70.2 million pounds were 9.3 million pounds above the 1964 total and accounted for the greater part of the overall increase of 12.3 million pounds.

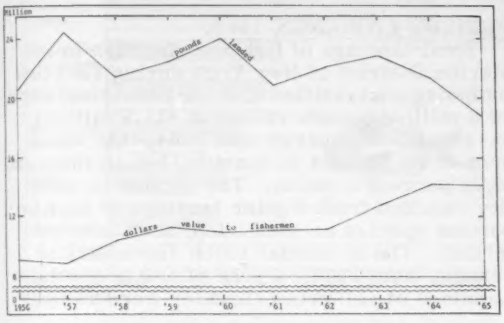
Ocean perch landings amounted to 60.3 million pounds compared with 58.9 million pounds in 1964. Knox County accounted for 61 percent of the total, while nearly all of the remainder was landed in Cumberland County. Landings of ocean perch taken from the Gulf of Maine declined slightly in 1965.

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, April 1, 1966, with Comparisons 1/

Type	Unit	1965/66 Season			1964/65 Season					1963/64			
		4/1/66	1/1/66	11/1/65	7/1/65	6/1/65	4/1/65	1/1/65	11/1/64	7/1/64	6/1/64	4/1/64	1/1/64
Distributors	1,000 actual cases	234	267	289	194	198	236	238	291	234	254	291	261
Canners	1,000 std. cases 2/	312	520	689	295	203	314	538	629	514	499	658	1,063

1/ Table represents marketing season from November 1-October 31.
2/ 100 3¾-oz. cans equal one standard case.
Note: Beginning with the Canned Food Report of April 1, 1963, U. S. Bureau of the Census estimates of distributors' stocks were based on a revised sample of merchant wholesalers and warehouses of retail multiunit organizations. The revised sample resulted in better coverage. The January 1, 1963, survey was conducted with both samples to provide an approximate measure of the difference in the two samples. That survey showed that the estimate of distributors' stocks of canned Maine sardines from the revised sample was 13 percent above that given by the old sample.
Source: U. S. Department of Commerce, Bureau of the Census, Canned Food Report, April 1, 1966.

Landings of whiting, 27.7 million pounds (live weight), were 10 percent above 1964 and set a new record for the second consecutive year. After getting off to a rather slow start, an increased fleet of otter trawlers and a slightly longer season resulted in the record catch. Cumberland County led in whiting landings with 19.7 million pounds, followed by Sagadahoc County with 4.1 million pounds and Lincoln County with 3.7 million pounds.



Maine lobster catch and value, 1956-65.

Lobster totals declined 12 percent from the previous year to 18.9 million pounds. This was the smallest catch since 1950 and was the cause for considerable concern throughout the industry. A cooperative program on the study of lobsters was undertaken by the Maine Department of Sea and Shore Fisheries and the U. S. Department of the Interior's Bureau of Commercial Fisheries in 1965. Lobster bait shortages, which are occurring more frequently each year, were alleviated somewhat in 1965 by a two-fold increase in the catch of alewives to 3.1 million pounds.

Shrimp landings (2.1 million pounds) set a record in 1965 and doubled the 1964 catch. Demand for those shellfish continued to grow at a rapid pace. There were two peeling machines in operation in 1965. Most of the shrimp were marketed as fresh and frozen raw peeled meats. (U. S. Department of the Interior, Bureau of Commercial Fisheries, Branch of Fishery Statistics.)

Marketing

EDIBLE FISHERY PRODUCTS, FIRST QUARTER 1966 AND REVIEW OF 1965:

The demand in the United States for edible fishery products is expected to continue strong throughout 1966, reflecting rising consumer income, relatively high meat prices anticipated through the summer months, and population gains. Moderate advances in retail prices for both canned and frozen products appear likely.

With the exception of red salmon, current supplies of most canned fishery products are about adequate. Supplies of frozen fishery products at the end of the first quarter in 1966 were up from the previous year, mainly because of larger stocks of imported fish blocks. Stocks of fish sticks and portions, spiny lobster tails, scallops, and crab meat were substantially larger than in the previous year. On the other hand, cold-storage holdings of raw, headless shrimp were down sharply.

Final data for 1965 indicate that per capita consumption of commercially-caught fish and shellfish amounted to 11.0 pounds, edible weight, up from 10.5 pounds in 1964 and 10.7 pounds in 1963. The increase resulted largely from increased consumption of canned fishery products, 4.4 pounds per person in 1965 compared with 4.1 pounds in 1964. Consumption of fresh and frozen fishery products in 1965 amounted to 6.1 pounds per person, up 0.2 pound from a year earlier. In addition, per capita consumption of fish and shellfish taken by sportsmen and for home use by commercial fishermen was estimated at 3 pounds per person.

Annual per capita consumption of commercially-caught fish and shellfish in the United States has, for many years, averaged 10 to 11 pounds except for a few years during the depression of the 1930's and World War II. Although the use of fresh and frozen fishery products has not shown a significant change in the past 30 years, there have been changes among products and species. The consumption of domestically-caught Atlantic mackerel, cod, haddock, ocean perch, and oysters, has declined significantly. Consumption of fish sticks and portions produced from imported fish blocks has increased. Shrimp consumption also has risen; both domestic production and imports of shrimp have grown.

Per capita consumption of canned fishery products reached a peak in the 1930's, averaging 4.7 pounds during the years from 1934 to 1939. Consumption of canned salmon declined from an average of 2.4 pounds per capita in the 1930's to less than 1 pound for each year since 1958. Consumption of canned Pacific sardines also has dropped sharply. Conversely, the use of canned tuna has grown rapidly, from a half pound per person in 1935 to more than 2 pounds since 1959. The consumption of cured fishery products fell steadily from 3 to 4 pounds per person early in the century to about a half pound in recent years.

Over half of the fishery products consumed in the United States came from abroad in 1965 (including raw materials used in domestic processing) and the strong domestic demand will continue to encourage imports. Prices of fresh or frozen tuna and shrimp, two of the largest import items, are much above spring 1965 levels. If domestic landings of those two species are not substantially higher than in 1965, imports must increase at a time when world-wide demand also is increasing. The United States already ranks as the world's largest importer of fishery products.

Note: This analysis was prepared by the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the U. S. Department of Agriculture's May 1966 issue of the National Food Situation (NFS-116).

New York

FISHERY LANDINGS, 1965:

Total landings of fish and shellfish in the Marine District of New York during 1965 (not including unclassified fish for reduction) were 69.0 million pounds valued at $11.9 million ex-vessel. Compared with 1964, that was a drop of 13 percent in quantity, but an increase of 20 percent in value. The decline in quantity resulted from lighter landings of such important species as menhaden, scup, and butterfish. The menhaden catch decreased 29 percent from 1964--a year of low production. Landings of yellowtail flounder were compar-

New York Marine Landings, 1965 and 1964

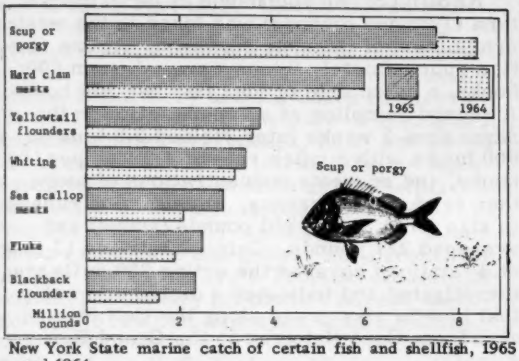
Species	1965		1/ 1964	
	Pounds	Value	Pounds	Value
Fish				
Bluefish	1,036,366	156,817	675,115	109,426
Butterfish	765,655	89,407	1,066,655	126,161
Cod	365,931	53,239	516,500	72,220
Flounders:				
Gray sole	21,800	2,362	14,620	2,072
Blackback	2,244,783	118,528	1,440,640	74,031
Yellowtail	3,671,223	262,335	3,561,810	233,403
Fluke	2,451,552	557,042	1,853,780	445,448
Unclassified	-	-	900	45
Menhaden	30,139,635	417,407	42,424,700	516,226
Scup or porgy	7,536,888	746,701	8,343,820	783,648
Sea bass	381,611	84,467	500,740	95,821
Striped bass	702,935	135,831	965,500	138,439
Whiting	3,337,645	160,522	3,123,200	159,323
Unclassified	2,765,409	226,472	3,198,340	260,785
Total Fish	55,421,433	3,011,130	67,686,320	3,017,048
Shellfish				
Lobsters, Northern	648,571	446,277	546,715	305,747
Clams:				
Hard	5,947,632	5,149,573	5,402,292	4,135,545
Razor	5,344	1,526	5,856	1,464
Soft	205,553	66,540	180,832	55,677
Surf	1,505,240	126,783	1,217,676	108,852
Conchs	42,900	9,669	40,950	7,989
Mussels, sea	295,310	44,813	124,950	16,512
Oysters	199,336	322,471	213,468	315,037
Scallops:				
Bay	886,043	721,497	687,096	731,474
Sea	2,917,153	1,898,374	2,044,332	1,114,682
Squid	974,063	66,009	1,007,130	74,008
Total Shellfish	13,627,145	8,853,532	11,471,297	6,866,987
Grand Total	69,048,578	11,864,662	79,157,617	9,884,035

1/In addition to the catch in the Marine District there was a catch in the Hudson River area totaling 172,100 pounds valued at $24,185 consisting of shad 78,200 pounds, striped bass 29,500 pounds, alewives 37,000 pounds, and other species 27,400 pounds.

Note: Does not include the catch of unclassified fish for reduction. Univalve and bivalve mollusks are reported in pounds of meats. All other species are shown in round weight.

able to 1964, and there were increases in fluke and blackback flounder landings.

The pound net catch showed no appreciable gains during the year. Scup and bluefish were the leading items with 7.5 and 1.0 million pounds, respectively. Catches of shad, menhaden, and herring by pound nets were light.



New York State marine catch of certain fish and shellfish, 1965 and 1964.

The commercial catch of striped bass failed to come up to that of 1964--the largest on record for New York. The total catch of 702,000 pounds was about the third largest in recent years, with 82 percent of the catch being landed by ocean-haul seiners. The otter trawl catch of striped bass was down sharply, particularly for the fall season.

Lobster production increased in both the offshore otter trawl and inshore pot fisheries. Ex-vessel values were high in both fisheries, ranging from 70 cents to $1.25 a pound.

Landings at New York City's Fulton Street Market in 1965 were 5.7 million pounds--a decrease of 11 percent compared with 1964. The decline was due to a drop in landings of scup and butterfish--two of the major species. Sea scallop landings increased over 1964, with the majority of the vessels fishing in waters off New York after the decline in production from areas off the Virginia Capes.

Hard clam production increased in quantity and value. The increase in production came in the summer season with many casual fishermen taking advantage of a good supply and high prices.

North Atlantic Fisheries Explorations and Gear Development

TUNA AND SWORDFISH DISTRIBUTION STUDIES IN NORTHWEST ATLANTIC CONTINUED:

M/V "Delaware" Cruise 66-2 (March 8-April 6, 1966): Concentrations of large bluefin tuna were located in the Gulf Stream area of the Northwestern Atlantic during a recent exploratory long line fishing cruise of the research vessel Delaware operated by the Bureau of Commercial Fisheries, U. S. Department of the Interior. The vessel utilized radio-facsimile equipment to receive daily sea surface temperature charts in determining optimum fishing areas. The one-month investigation covered a 750-mile section of the Gulf Stream from south of Cape Cod to south of Newfoundland and obtained new seasonal distribution information on bluefin, yellowfin, big-eyed, and albacore tuna, as well as swordfish.

Fig. 1 - A deck sample of bluefin, yellowfin, and albacore tuna, and swordfish were part of a day's 9-ton long-line catch in the Gulf Stream by the M/V Delaware.

OBJECTIVES: Principal objectives of the cruise were to : (1) evaluate methods of lo-

cating tuna and swordfish concentrations based on analysis of the thermal environment structure, and (2) survey the distribution and abundance of tuna and swordfish in the Northwestern Atlantic during late winter.

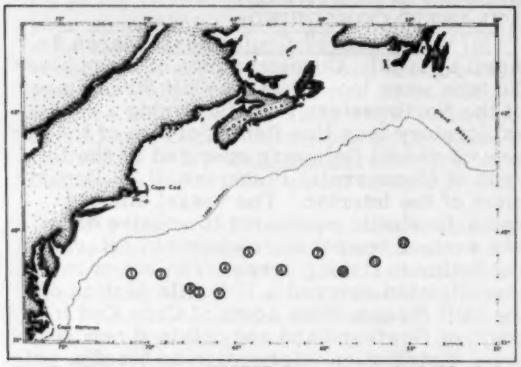


Fig. 2 - Station pattern of M/V Delaware Cruise 66-2 (March 8-April 6, 1966.)

GEAR USED: Fishing gear consisted of 165-fathom units of long line with ten branchlines attached at 15-fathom intervals. Each 10-hook unit was buoyed from the surface with a 5- or 20-fathom line. Squid and herring baits were alternately used on every other unit. Adjunct equipment included a marine radiofacsimile recorder, bathythermographs (BT's), bathykymographs (BKG's), and a recording thermograph.

METHODS OF OPERATION: The approximate geographic position of each fishing station was selected using data from general sea surface temperature isotherm charts and sonic layer depth charts received daily from the U. S. Naval Oceanographic Office by the radiofacsimile recorder on the vessel. The validity of the data was checked and the exact position of each station was determined from analysis of actual observations on sea surface temperature variation by recording thermograph, and BT's along the vessel track into the area. With the exception of two day sets of long-line gear, 60 units of long-line gear (600 hooks) were set after midnight at each station and hauled after sunrise to permit the gear to fish during the dark and light hours of the day. The effect of current on the gear was measured by plots of Loran bearings on the ends of the long-line set at time of setout and haulback. BT recordings of the subsurface-temperature profile were taken at the time and position of each Loran bearing. The depth of the gear, and the time and depth of fish hooked, were recorded by BKG instruments placed at the centers (between hooks 5 and 6) of several units on each set. An exact time record was kept on each unit of gear retrieved to relate the fish catch to surface temperature variations on the thermograph.

RESULTS: An abundance of large bluefin tuna (Thunnus thynnus) was found in the western portion of the area surveyed. At one station approximately 9 tons were taken on 600 hooks, a catch rate of 12.3 fish per 100 hooks. A second sampling at another station in the same area 2 weeks later yielded 3.5 tons on 600 hooks with a catch rate of 4.2 fish per 100 hooks, and suggests concentrations of more than random occurrence. Bluefin tuna ranged in size from 215 to 340 pounds (round) and averaged 277 pounds. Catches totaling 17 tons at 8 stations covered the entire 750-mile area investigated and indicated a distribution of that bluefin size group along the Gulf Stream area from Cape Hatteras to the Grand Banks.

Catches of swordfish (Xiphias gladius) at six stations covering the entire area of investigation indicated a thin distribution of the species along the Gulf Stream area at that time of year. Although the catches were small (17 total) it is noteworthy that the size of fish in the western portion of the area (18-110 pounds, 13 fish) was much smaller than fish in the eastern portion (155-350 pounds, 4 fish). Average size of swordfish on the cruise was 107 pounds.

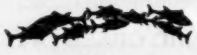
Yellowfin tuna (Thunnus albacares) were found at 4 of the 5 stations having surface temperature of 69° F. or greater. Average weight of 18 fish caught was 35 pounds. Albacore (Thunnus alalunga) were taken in small numbers at all but the 3 westernmost stations, providing new distributional information on the species at that time of year. Size of albacore averaged 34 pounds, with a range of 10 to 59 pounds. Big-eyed tuna (Thunnus obesus) were taken at 4 stations, with a good catch rate (2.5 fish per 100 hooks) at one of the stations. Size of big-eyed tuna averaged 102 pounds, with a range of 31 to 138 pounds.

Large catches of blue shark (Prionace glauca) were made throughout the area. A total catch of 359 blue shark from the 12 stations fished weighed an estimated 16 tons. Shark damage to fish was not significant, although considerable time was lost due to frequent snarls and parting of the gear.

Other catches of interest were 5 specimens of the pelagic stingray (Dasyatis violacea) and 1 Atlantic loggerhead turtle (Caretta caretta).

In cooperation with the Woods Hole Oceanographic Institution a total of 92 tuna, 2 swordfish, and 1 turtle were marked and released using dart tags. Sharks tagged and released in conjunction with U. S. Department of Interior shark studies at the Bureau of Sport Fisheries and Wildlife Sandy Hook Marine Laboratory and the Shark Research Panel of the American Institute of Biological Sciences totaled 315. Shark, tuna, and swordfish eyes and shark vertebral columns were frozen for research studies at the Retina Foundation of the Massachusetts General Hospital and Harvard Medical School. Bluefin tuna stomachs and gonads were frozen for analysis at the Bureau's Tropical Atlantic Biological Laboratory in Miami, Fla., and specimens of bluefin, big-eyed, and albacore tuna were preserved frozen for anatomical studies at the U. S. National Museum and the Bureau's Ichthyological Laboratory, Washington, D. C. During the cruise, 45 BT messages were transmitted to the Naval Oceanographic Office through Coast Guard radio stations.

Note: See Commercial Fisheries Review, March 1966 p. 31.



North Atlantic Fisheries Investigations

LARVAL HERRING DISTRIBUTION IN GULF OF MAINE STUDIED:

M/V "Rorqual" Cruise 2-66 (February 14-March 6, 1966): To determine the distribution of larval herring along the coast of the Gulf of Maine was the objective of this cruise by the research vessel Rorqual, operated by the Bureau of Commercial Fisheries, U. S. Department of the Interior, Biological Laboratory, Boothbay Harbor, Me. The area of operations was between Cape Ann and Grand Manan Channel.

BIOLOGICAL OBSERVATIONS: A total of 50 stations was occupied. Three-mile oblique tows were made at each station using the Boothbay No. 4 trawl. One Gulf III oblique tow was made in the Grand Manan Channel.

HYDROGRAPHIC OBSERVATIONS: Surface temperatures and salinities were taken at each station. Five drift bottles and 5 sea-bed drifters were released at 21 standard stations. A Nansen bottle cast, a bathythermograph (BT) cast, and a Secchi disc reading were taken at the Grand Manan station.

PRELIMINARY FINDINGS: Nearly 2,000 (1,912) larval herring were caught ranging in standard length from 17 to 46 millimeters (0.7 to 1.8 inches). The heaviest concentrations were found in Ipswich Bay and off Bluehill, Frenchmans and Pleasant Bays. Mean lengths were generally larger in the west and east and smallest near Penobscot Bay. The largest mean length was from a catch off Machias Bay.

M/V "Rorqual" Cruise 3-66 (March 16-23, 1966): The Bureau's research vessel Rorqual continued its operations between Cape Ann and Grand Manan Channel during the cruise to determine the distribution of larval herring along the coastal Gulf of Maine.

BIOLOGICAL OBSERVATIONS: Oblique tows with the Boothbay No. 4 trawl were made for larval herring at 50 stations. A watch was kept for schools of sardine-sized herring. Meter net tows were made along the coast for barnacle larvae.

HYDROGRAPHIC OBSERVATIONS: Surface temperatures and salinities were taken at each station. A total of 5 drift bottles and 5 sea-bed drifters were released at 21 stations.

PRELIMINARY FINDINGS: Larval herring were abundant during this cruise. The total catch was 1,954. The larvae ranged from 20-40 millimeters (0.8 to 1.6 inches) standard length. One school of sardine-sized herring was sighted on the surface 3 miles southeast of Pemaquid Point. Barnacle larvae were not present along the coast in large numbers.

Note: See Commercial Fisheries Review, January 1966 p. 42.

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LOBSTER AND SEA HERRING POPULATION STUDIES CONTINUED:

R/V "Albatross IV" Cruise 66-5 (April 19-29, 1966): To sample populations of sea herring and lobsters and obtain related environmental data was the main objective of this cruise by the research vessel Albatross IV of the U. S. Bureau of Commercial Fisheries. Other objectives were to: (1) obtain blood samples from sea herring and lobsters, (2) make plankton tows for herring larvae, and

(3) observe lobster habitat using a deep-sea still picture camera. The areas of operation were Cape Cod Bay, Stellwagen Banks, Jeffreys Ledge, general area of George Bank, Corsair, Lydonia, Veatch and Hudson Canyons, and South Long Island Slope.

The Albatross IV, research vessel of the U. S. Bureau of Commercial Fisheries.

FISHING OPERATIONS: Herring: Three herring trawl sets lasting 1 hour each were made at some stations in waters of 24 to 50 fathoms yielding a total of 4 bushels. The herring obtained were from 19.5 to 32.5 centimeters (about 8 to 13 inches) long. At another lobster station a half bushel of herring was obtained and those fish were from 24.4 to 30.1 centimeters (about 10 to 12 inches) long. The majority of herring in the samples were from the 1960 and 1961 year-classes. Shipboard examination of gonadal condition showed that the majority of the fish were in late stage VIII of maturity. A total of 70 herring blood samples was taken for analysis.

Lobster: A total of 29 trawl sets was made at the 5 major lobster stations covered. The sets made in waters of 60 to 160 fathoms yielded about 950 lobsters, 55 percent females and 45 percent males--63 of the females were berried. The average weight of the entire catch was 4 pounds, and the average weight of legal size lobsters was 5 pounds. The range in weight of the entire catch was 0.1 to 22 pounds. The largest catch occurred on Hudson Canyon where 10½ baskets of lobsters were obtained from a 1-hour tow. Large lobsters were prevalent on Lydonia and Oceanographer Canyons, while short lobsters were prevalent in the catches from Veatch's and Hudson Canyons. A total of 42 lobsters was collected from the 16 lobster stations fished on the South Long Island Slope and the 3 lobster stations fished in the Gulf of Maine. The largest catch in that transect made at one station yielded 13 lobsters. One lobster (5 pounds) was collected from the Stellwagen Bank station. Species of fish, other than herring, collected during the cruise were haddock (30 bushels), American dab (2 bushels), yellowtail (7 bushels), winter flounder (1½ bushels), sand dab (1 bushel), alewives (¼ bushel), cod (7 bushels), eel pout (5 bushels), pollock (5 bushels), cusk (1 bushel), hake (1 bushel), sculpin (½ bushel), dogfish (7,500 lbs.), goose fish (3,700 lbs.), halibut (4 pounds), and grenadiers (¼ bushel).

CAMERA OPERATIONS: In all, 7 camera "drops" were made during the cruise. During each drop 20 to 30 pictures of the ocean bottom were taken, mostly in known lobster grounds. The drops were made on the slopes of Georges Bank and on the troughs, slopes and runs of Lydonia, Veatch and Hudson Canyons.

PLANKTON OPERATIONS: During the cruise, 18 one-meter net plankton tows lasting 15 minutes each (5 minutes at 20 meters, 5 minutes at 10 meters, and 5 minutes at the surface) were made. A total of 6,305 herring larvae with an average length of 39 millimeters or about 1.5 inches (range 30 to 50 millimeters or 1.2 to 2.0 inches) were obtained. Approximately 80 percent of the larvae were from 3 stations. No larvae were obtained at the other stations.

HYDROGRAPHIC OBSERVATIONS: Sea bed drifters and drift bottles were released at selected stations along the Continental Shelf. At each trawl station bathythermograph (BT) casts were made, salinities collected, and weather observations recorded.

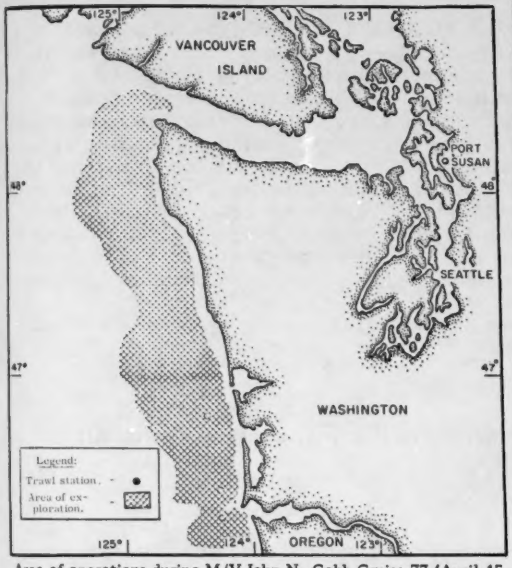
Note: See Commercial Fisheries Review, January 1966 p. 41.

North Pacific Fisheries Explorations and Gear Development

HAKE AND ANCHOVY POPULATION SURVEY CONTINUED:

M/V "John N. Cobb," Cruise 77 (April 13-May 4, 1966): A 3-week pelagic survey for northern anchovy (Engraulis mordax) in waters off the Washington coast between Cape Flattery and the Columbia River mouth was recently completed by the exploratory fishing vessel John N. Cobb, operated by the Bureau of Commercial Fisheries, U. S. Department of the Interior. Two days of the alloted time

of the cruise were used in pelagic fishing and gear evaluation in Puget Sound prior to the scheduled departure date.



Area of operations during M/V John N. Cobb Cruise 77 (April 15-4, 1966).

OBJECTIVES: The primary objectives of the cruise were to: (1) obtain data on the geographic and bathymetric distribution of northern anchovy during the time interval mid-April-early May; (2) obtain data on the catching efficiency of the modified $\frac{2}{3}$-scale, $\frac{3}{4}$-inch mesh version of the Mark II "Cobb" pelagic trawl for northern anchovy; and (3) obtain biological information on northern anchovy. A secondary objective was to obtain samples of northern anchovy for composition analysis by the Bureau's Seattle Technological Laboratory. Objectives of the 2-day pelagic fishing and gear evaluation effort in Puget Sound were to: (1) have SCUBA equipped divers assess the degree of structural modification necessary to achieve proper trawl pattern of the $\frac{2}{3}$-scale net; (2) fish the unmodified trawl on concentrations of Pacific hake (Merluccius productus) in Port Susan; and (3) return samples of Pacific hake and plankton to the Bureau's Seattle Biological Laboratory for biological analysis.

GEAR: Midwater trawls fished during the survey were: (1) the Standard Mark II "Cobb" pelagic trawl, constructed of 3-inch mesh multifilament webbing, equipped with a full $\frac{1}{2}$-inch mesh liner in the cod-end, and (2) the modified $\frac{2}{3}$-scale, $\frac{3}{4}$-inch-mesh version of the Mark II "Cobb" pelagic trawl. Both trawls were fished with a pair of 5-by 8-foot aluminum hydrofoil-type otter boards attached to 30-fathom bridles. Fishing depth of the trawl was monitored by using a dual electrical depth telemetering system, with the depth sensing units positioned on the trawl at the lower end of the wings. A high-resolution, low-frequency echo sounder was used to locate fish schools.

METHODS OF OPERATIONS: Onshore-offshore echo-sounding transects were made at oblique angles to the coast between the 10- and 140-fathom isobaths. Upon location, fish populations were sampled with a pelagic trawl to obtain data on species composition and availability to the trawl. Post-sampling procedures included the outlining of significant schooling areas by closely spaced echo-sounding transects. A bathythermograph cast, with its associated sea-surface reference temperature, was made after each haul.

TWO-DAY PUGET SOUND EFFORT: One drag, 2 plankton tows, and 5 bathythermograph casts were made in Puget Sound. A 2-minute drag at latitude 48°06.6' N. and longitude 122°22.8' W., was made on strong echo traces ranging between 45 and 63 fathoms over an average bottom depth of 65 fathoms. About 9,000 pounds of Pacific hake were collected. A random sample (289 fish) showed a 3.1:1 male to female sex ratio, respectively. Length measurements ranged from 31 to 46 centimeters (12.2 to 18.1 inches), with males averaging 35.0 centimeters (13.8 inches), and females 37.9 centimeters (about 14.9 inches). Gonads were observed in various stages of development. A brief examination by personnel from the Seattle Biological Laboratory showed that both plankton samples contained hake-like eggs. Vertical temperature profiles taken in Port Susan showed surface water temperatures ranging from 49.8° to 51.2° F., while corrected temperatures at 65 fathoms ranged from 48.5° to 49.9° F.

SCUBA-equipped divers observed that the unmodified $\frac{2}{3}$-scale, $\frac{3}{4}$-inch mesh version of the Mark II "Cobb" pelagic trawl showed an excessive amount of ballooning web while under tow at a balanced depth of 10 fathoms. This feature was successfully corrected by lengthening the criss-cross riblines. This modified version was then used during the remainder of the cruise.

WASHINGTON COAST EXPLORATIONS: A total of 6 hauls, 5 with the modified $\frac{2}{3}$-scale, $\frac{3}{4}$-inch mesh trawl and one with the Standard Mark II "Cobb" trawl was made off the Washington coast between Grayland and the Columbia River Lightship over average bottom depths ranging from 23 to 74 fathoms. Anchovy was the dominant species collected, followed by silvergray rockfish (Sebastodes brevispinis), yellowtail rockfish (Sebastodes flavidus), starry flounder (Platichthys stellatus), and dogfish (Squalus acanthias).

No echo traces indicating anchovy were observed between the 10- and 140-fathom isobaths from Cape Flattery to Grays Harbor during the survey. The area between Grays Harbor and Pacific Park showed an occasional weak to fair echo trace over bottom ranging from 19 to 41 fathoms. A total of 75 pounds of anchovy was collected from a 10-minute tow off Grayland, on light scattered traces ranging from 8 to 15 fathoms in depth over an average bottom depth of 33 fathoms. These fish ranged from 6 to 13 centimeters (2.4 to 5.1 inches) and averaged 8.96 centimeters (3.5 inches) in length.

The area between Pacific Park and the Columbia River Lightship showed several fair to excellent concentrations of anchovy-like traces between the 12- and 74-fathom isobaths. Excellent echo traces showing several concentrations of anchovy-like signs were located throughout a $2\frac{1}{2}$- by $1\frac{1}{4}$-mile area lying west of the Columbia River mouth over bottom ranging from 21 to 35 fathoms. A 5,000-pound catch of anchovy was made in a 15-minute tow on those traces, which ranged from 18 to 32 fathoms in depth over an average bottom depth of 35 fathoms. These fish ranged 10 to 18 centimeters (3.9 to 7.1 inches) and averaged 14.15 centimeters (5.6 inches) in length. Extreme gilling was observed throughout the bag of the $\frac{2}{3}$-scale $\frac{3}{4}$-inch mesh trawl. Excessive gilling occurred again during a 60-minute tow off Peacock Spit. A total of 3,000 pounds of anchovy was collected from heavy echo traces ranging from 14 to 21 fathoms in depth over an average bottom depth of 23 fathoms. Anchovy ranged from 11 to 18 centimeters (4.3 to 7.1 inches) and averaged 15.03 centimeters (5.9 inches) in length. A single 30-minute tow, with the Standard Mark II "Cobb" pelagic trawl, yielded 18,000 pounds of anchovy off Cape Disappointment. Heavy echo traces ranged from 17 to 22 fathoms in depth over an average bottom depth of 23 fathoms. No gilling was observed during this tow. No signs were observed between the 10- and 50-fathom isobaths south of the Columbia River Lightship.

COOPERATIVE STUDIES: In cooperation with the Bureau's Seattle Technology Laboratory, about 7 tons of northern anchovy were delivered to a commercial fish company in Warrenton, Oreg., for experimental reduction studies. Samples of anchovy were retained and frozen from most hauls for proximate composition studies by the Seattle Technology Laboratory. Two tows with a 1-meter plankton net were made in Port Susan, Puget Sound, for additional information on Pacific hake studies presently being conducted by the Bureau's Seattle Biological Laboratory.

Note: See Commercial Fisheries Review, June 1966 p. 25.

North Pacific Fisheries Investigations

SALMON RESEARCH CRUISES PLANNED FOR SUMMER 1966:

The U. S. Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory in Seattle, Wash., will send its research vessel, the George B. Kelez, and two chartered vessels to the North Pacific during summer 1966 for research on salmon. The Bureau's research vessel will fish a series of stations south of Unalaska Island along long. 167° W. Two chartered vessels, the Paragon and St. Michael, are to fish stations about 330 miles east and west of the George B. Kelez at long. 176° W. south of Adak Island, and at long. 158° W. south of the Shumagin Islands.

Fig. 1 - Bureau of Commercial Fisheries vessel R/V George B. Kelez.

Stations will be fished on each longitudinal line to study the north-to-south distribution of immature salmon south of the Aleutian Islands and Alaskan Peninsula. Repeated fishing at the various stations will yield data on movement and changing characteristics (species, age, origin, etc.) of salmon populations in those areas with time. Fishing will continue from about July 1 until about September 1, 1966. Sampling gear will be surface gill nets 1,400 to 1,500 fathoms long, consisting of four mesh sizes--$2\frac{1}{2}$, $3\frac{1}{4}$, $4\frac{1}{2}$, and $5\frac{1}{4}$ inches (stretched measure).

Fig. 2 - Bureau of Commercial Fisheries chartered vessel M/V Paragon.

Fig. 3 - Bureau of Commercial Fisheries chartered vessel M/V St. Michael.

Primary objectives of the summer cruise are to:

(1) Determine the relative abundance, north-to-south distribution, age composition, and racial origin of immature salmon south of the Alaska Peninsula and Aleutian Islands. This information may suggest more accurate methods of forecasting runs of sockeye salmon in Bristol Bay.

(2) Determine the percentage of captured fish that drop out of high seas gill nets before they are landed. Direct observation of salmon in the nets while the nets are fishing will be attempted in order to establish the dropout rate.

(3) Compare catches from gill nets and purse seines for information on selectivity of both types of gear for certain species, sizes, and ages of salmon.

(4) Obtain oceanographic data to improve understanding of the distribution and abundance of salmon.

This cruise will be the greatest effort in personnel and vessels that the Bureau's Seattle laboratory has expended in several years. Detailed knowledge of the summer distribution of immature salmon from areas south of the Shumagin Islands as far west as Adak Island, a distance of over 700 miles, is expected to be gained from studies.

--By Richard Bakkala, Fishery Research Biologist,
Biological Laboratory,
U. S. Bureau of Commercial Fisheries,
Seattle, Washington 98102

Oceanography

MANUFACTURERS INVITED TO EXHIBIT PRODUCTS AT FRANKFURT, GERMANY:

An opportunity for United States manufacturers to open outlets in Western Europe for oceanographic instrumentation, equipment, systems, and services was announced by the U. S. Department of Commerce on April 12, 1966. The Department's Bureau of International Commerce (BIC) will give its first overseas exhibition of oceanographic products at the U. S. Trade Center in Frankfurt, West Germany, on November 2-9, 1966. United States manufacturers are invited to show and sell.

A broad market development campaign is underway to attract buyers, agents, and distributors to the exhibition from West Germany and from neighboring countries of Western Europe.

A market survey conducted in Western Europe for the U. S. Bureau of International Commerce pinpointed business opportunities. Among some of the business opportunities were: ocean mineral and food resources development; fisheries research and fish farming; marine and civil underwater engineering, construction, and harbor installation; marine biology and geophysical oceanic research, underwater TV, and movies; and hydrography. The survey revealed that a growing number of European firms was interested in diversifying their capabilities to take advantage of advanced ocean sciences and engineering to develop the vast resources of the ocean.

As in the United States, Western European firms and organizations, both private and government, now are engaged in a wide variety of oceanographic activities--physics, chemistry, meteorology, graphics, geology, metallurgy, biology, medicine, naval architecture, and civil engineering.

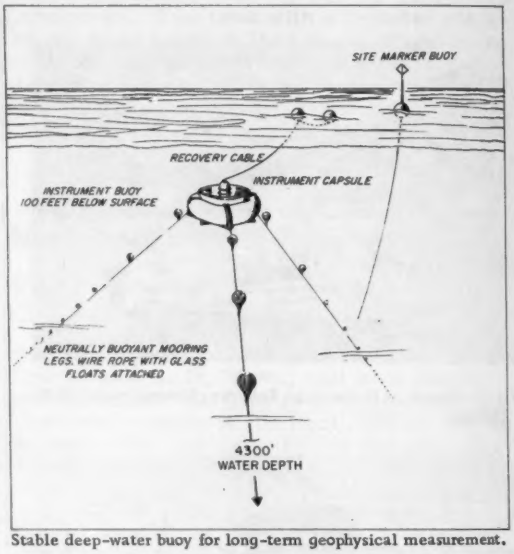
U. S. firms interested in taking part in the Frankfurt Trade Center show may obtain additional information and marketing facts from the Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. 20230, or from any of the Department's 42 field offices.

* * * * *

DEEP-WATER BUOY SYSTEM IMPLANTED OFF CALIFORNIA COAST FOR OCEAN RESEARCH:

The successful implantation of a three-point buoy moor in deep water (4,300 feet) was recently made by a marine engineering firm. This buoy system, installed for the Environmental Scientific Services Administration (ESSA) of the U. S. Coast and Geodetic Survey, is located 80 miles off the California coast. The purpose of the buoy system is to support instruments which are recording continual magnetic measurements for the first time in the deep ocean basin. The project scientist for ESSA termed the retrieval of the first 60 days of recorded data as a "significant step toward the establishment of magnetic observatories throughout the 78 percent of the world covered by the oceans". Previously, the engineering firm successfully implanted and recovered a similar buoy system for ESSA in 12,000 feet of water.

The system consists of a stable toroidal (doughnut-shaped) buoy, 8 feet in diameter, moored 100 feet below the water's surface. The buoy is anchored in exact position by three 6,150 ft. wire mooring legs. To prevent the wire legs from sagging, glass floats are attached at 120-foot intervals along each of the legs. The foam-filled buoy supports an instrument case containing a magnetometer which measures the earth's magnetic field vector. After 30 days, the magnetometer is removed from the buoy and the batteries are recharged for 24 hours; the instrument is then reinstalled in the buoy.



Stable deep-water buoy for long-term geophysical measurement.

According to the engineering firm, this buoy system is the first to hold position without vertical, horizontal, or rotational movement and to allow the collection of precise deep-ocean geophysical measurements. Although it was designed by ESSA primarily as a deep-sea magnetometer station, the system provides a highly stable platform which readily can be instrumented with a variety of other sensors. For example, it can be used to measure deep-sea tides, seismic sea waves (tsunamis), or to provide a geodetic bench mark. "Hopefully, a series of these buoy systems will be implanted throughout the world enabling man to increase his knowledge and understanding of the deep ocean," said the ESSA scientist.

Salmon

U. S. PACIFIC COAST
CANNED STOCKS, APRIL 1, 1966:

On April 1, 1966, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 1,183,396 standard cases (48 1-lb. cans)--302,551 cases less than on March 1, 1966, and 252,349 cases less than on April 1, 1965, when stocks totaled 1,435,745 standard cases.

On the basis of total stocks of 1,621,019 actual cases (consisting of cans of $\frac{1}{4}$-lb., $\frac{1}{2}$-lb., 1-lb., etc.), red salmon accounted for 1,112,151 cases (mostly 1-lb. and $\frac{1}{2}$-lb. cans) or 68.6 percent of the total canners' stocks on April 1, 1966; pink salmon accounted for 255,864 cases or only 15.8 percent (148,831 cases were 1-lb. talls). Next came coho or silver (102,039 cases), followed by chum (92,726 cases), and king salmon (58,239 cases).

Table 1 - Total Canners' Stocks of Pacific Canned Salmon, April 1, 1966

Species	Apr. 1, 1966	Mar. 1, 1966	Feb. 1, 1966
	(No. of Actual Cases)		
King	58,239	66,421	87,321
Red	1,112,151	1,315,770	1,553,294
Coho	102,039	119,342	155,072
Pink	255,864	365,595	520,292
Chum	92,726	142,969	201,711
Total	1,621,019	2,010,097	2,517,690

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965, the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

Shipments at the canners' level of all salmon species from July 1, 1965, to April 1, 1966, totaled 3,091,366 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 96 percent of the 1965 salmon pack. (Division of Statistics and Economics, National Canners Association, April 27, 1966.)

Note: See Commercial Fisheries Review, June 1966 p. 30.

Sea Scallops

SUPPLIES PLENTIFUL DURING FIRST QUARTER OF 1966:

The consumption of sea scallops in the United States was up sharply as of March 1966. January-March 1966 consumption was 8.5 million pounds compared with 6.0 million pounds a year earlier--42-percent increase. Much of the increase in consumption can be attributed to lower retail prices, particularly for frozen scallops. In March 1966, retail prices for fresh and frozen scallops at Boston averaged 13 percent below the December 1965 levels. Prices for frozen scallops in Balti-

Table 2 - Total Canners' Stocks on Hand April 1, 1966 (Sold and Unsold), by Species and Can Size

	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48/$\frac{1}{4}$ lb.	3,763	138,101	46,098	2,386	132	190,480
48/$\frac{1}{2}$ lb.	52,165	381,217	36,001	99,802	20,341	589,526
48/1 lb.	2,019	589,744	16,144	148,831	69,719	826,457
12/4 lb.	292	3,089	3,796	4,845	2,534	14,556
Total	58,239	1,112,151	102,039	255,864	92,726	1,621,019

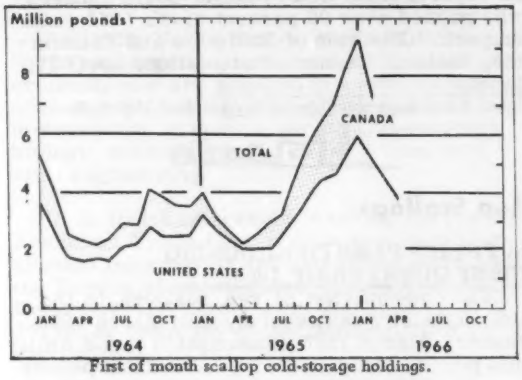
Table 3 - Canners' Shipments from July 1, 1965 to April 1, 1966, by Species and Can Size

	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48/$\frac{1}{4}$ lb.	10,437	286,947	78,740	6,107	-65	382,166
48/$\frac{1}{2}$ lb.	116,687	601,798	96,547	312,538	73,751	1,201,321
48/1 lb.	18,712	870,879	91,956	900,806	428,824	2,311,177
12/4 lb.	-37	6,370	10,473	53,094	14,087	83,987
Total	145,799	1,765,994	277,716	1,272,545	516,597	3,978,651

more averaged 23 percent below December.

Prices broke at the ex-vessel and wholesale levels in December because cold-storage holdings in the United States and Canada were at record highs. Wholesale prices leveled off in January and February 1966 but dropped steadily in March, although not as emphatically as at the close of 1965.

Following the large drop in ex-vessel prices in December, part of the loss was recovered in January. Since the middle of February, ex-vessel prices have edged downward.



First of month scallop cold-storage holdings.

Prices at all levels dropped during the first quarter of 1966 because of abundant supplies. In addition to the high U. S. and Canadian inventory carryover of frozen scallops at the end of 1965, scallop fishing has been good. New England landings in the first quarter of 1966 were about 27 percent above a year earlier. When the increased U. S. and Canadian landings are added to frozen inventories on hand January 1, 1966, total U. S.-Canadian supplies in January were 10.4 million pounds, or more than double the supplies of a year earlier.

With lower prices stimulating consumption, the larger supplies have moved quickly into retail channels. U. S. cold-storage holdings were cut sharply in the first quarter 1966 because consumption was greater than U.S. landings and imports. By April 1, U. S. cold-storage holdings were only 3.8 million pounds--down from the 5.9 million pounds on hand January 1. Although April 1, 1966, holdings were much above the 2 million pounds on hand April 1, 1965, price levels prevailing in the first quarter of this year probably will reduce frozen stocks to near year-ago levels by mid-1966.

Further price weakness would appear unwarranted because:

1. Stocks were reduced substantially in March when retail prices showed a tendency to level off.

2. The scallop fleet was fishing off New York and New Jersey during April. Although production in the first quarter 1966 was well above a year earlier, there is some question as to how long that area can sustain heavy fishing effort.

3. The fleet must return to the fishing grounds on Georges Bank when the fishing area off New York and New Jersey is depleted for this season. Biologists of the U. S. Bureau of Commercial Fisheries see no increase in abundance for 1966 on Georges Bank, and it might possibly be less. With little competition from the United States fleet, Canadian vessels on Georges Bank in January increased their catch only 19 percent over the previous year. While the American fleet is off New York and New Jersey, the Canadian fleet can be expected to harvest scallops from the most productive areas on Georges Bank. Therefore, if the United States fleet fishes out the New York and New Jersey beds, there is the question of what will be the abundance and size of scallops on Georges Bank when the United States fleet returns to those grounds.

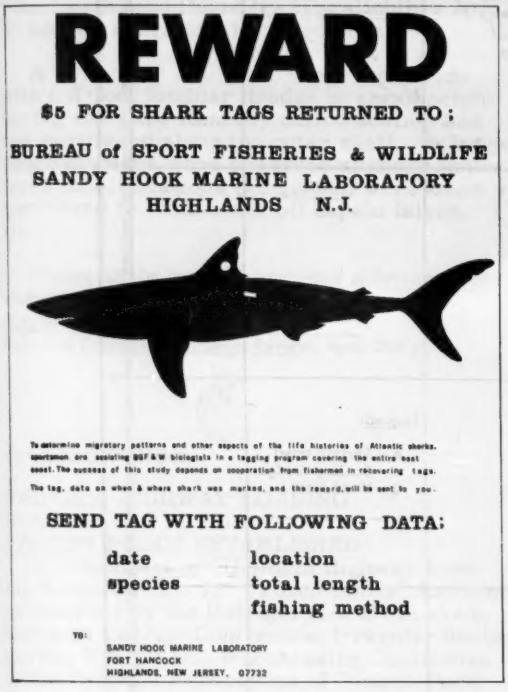
There is a possibility of light scallop supplies and rising prices in the last half of 1966. This is primarily dependent on how soon the Middle Atlantic grounds are fished out and the abundance of market scallops on Georges Bank. (U. S. Bureau of Commercial Fisheries, Branch of Current Economic Analysis, Shellfish Section.)

Shark

REWARD OFFERED FOR TAG RECOVERIES:

A shark tagging program covering the entire east coast is being conducted by the U. S. Bureau of Sport Fisheries and Wildlife Sandy Hook Marine Laboratory in Highlands, N.J., to determine migratory patterns and other aspects of the life histories of Atlantic sharks. A $5.00 reward is offered for shark tags re-

turned to the Laboratory. The tag should be returned with information on date recovered, species, location, total length, and fishing method.


REWARD
$5 FOR SHARK TAGS RETURNED TO:
BUREAU of SPORT FISHERIES & WILDLIFE
SANDY HOOK MARINE LABORATORY
HIGHLANDS N.J.
To determine migratory patterns and other aspects of the life histories of Atlantic sharks, sportsmen are assisting BSF&W biologists in a tagging program covering the entire east coast. The success of this study depends on cooperation from fishermen in recovering tags.
The tag, data on when & where shark was marked, and the reward, will be sent to you.
SEND TAG WITH FOLLOWING DATA:
date
species
location
total length
fishing method
TO:
SANDY HOOK MARINE LABORATORY
FORT HANCOCK
HIGHLANDS, NEW JERSEY. 07732

While the Laboratory program is not the only shark tagging program being conducted, it is the principal one on the United States east coast. Sportsmen are assisting Bureau biologists in the program and success of the study depends on cooperation from fishermen in recovering tags. Largely through these sportsmen's efforts, over 2,500 tagged sharks are now at liberty in the Atlantic Ocean.

The yield of scientific information from these studies depends on tag recoveries. Since sharks are not fished commercially to any extent along the east coast, it is important that fishermen are on the lookout for the tagged specimens. In order to acquaint fishermen with the study, the Sandy Hook Marine Laboratory has distributed reward posters at docks, tackle shops, marinas, and other places in different areas. The Laboratory hopes to cover the coast from Maine to Texas with this information so that tag recoveries will increase as more people become aware of the program.

An important world-wide shark program is being conducted by the American Institute of Biological Sciences under the direction of Stewart Springer, U. S. Bureau of Commercial Fisheries, Stanford University, Stanford, Calif. In addition to the United States programs, biologists in Canada, South Africa, Norway, Australia, and New Zealand also have an interest in shark migration studies. Earlier tagging programs, particularly in Australia, have produced major contributions to understanding the life history of commercially valuable sharks in that area.

South Atlantic Fisheries Explorations and Gear Development

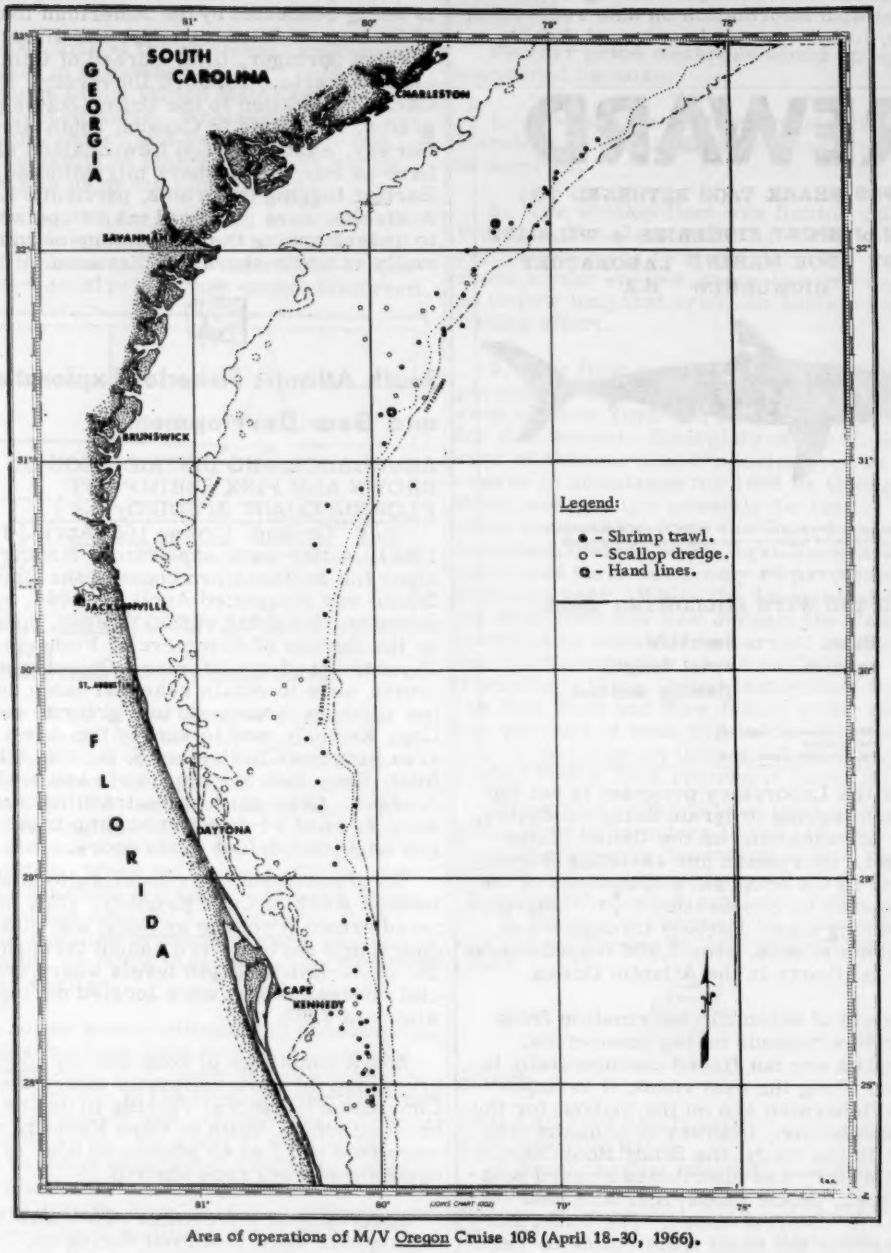
ABUNDANCE AND DISTRIBUTION OF BROWN AND PINK SHRIMP OFF FLORIDA COAST STUDIED:

M/V "Oregon" Cruise 108 (April 18-30, 1966): A two-week exploratory fishing cruise along the southeastern coast of the United States was completed April 30, 1966, by the exploratory fishing vessel Oregon, operated by the Bureau of Commercial Fisheries, U. S. Department of the Interior. Objectives of the cruise were to obtain seasonal catch data on the offshore brown shrimp grounds south of Cape Kennedy, and to survey the outer shelf area between Charleston, S. C., and Sebastian Inlet, Fla., with shrimp trawls and scallop dredges. Gear used in the trawling transects were 40- and 60-foot flat shrimp trawls rigged on 6- and 8-foot chain doors.

No grooved shrimp concentrations were located south of Cape Kennedy. Only scattered brown (Penaeus aztecus) and pink (P. duorarum) shrimp were caught through the 25- to 30-fathom depth levels where commercial concentrations were located during the winter of 1965.

Small quantities of rock shrimp (Sicyonia brevirostris) were uniformly distributed from Charleston to central Florida in depths of 15 to 50 fathoms. South of Cape Kennedy catches increased to 12 to 65 pounds an hour of 21-25 count (heads-on) rock shrimp.

Several good indications of bottomfish concentrations were observed during the cruise. Two-hour drags with 40-foot trawls off Daytona Beach in 25 to 30 fathoms yielded 300 to 1,300-pound catches of $\frac{1}{4}$-pound spot (Leio-



Area of operations of M/V Oregon Cruise 108 (April 18-30, 1966).

stomus xanthurus). Other food fishes were taken at the following maximum rates: croakers (Micropogon undulatus), 161 pounds averaging ½ pound each; black sea bass (Centropristes striatus), 208 pounds averaging ½ pound each; and flounders (Paralichthys sp.), 50 pounds averaging 1½ pounds each.

A total of 33 half-hour drags was made with a 6-foot tumbler dredge in areas neighboring the Cape Kennedy calico scallop bed and northward along the outer shelf. No large concentrations were observed although scattered small scallops (P. gibbus) were found northward to 40 fathoms off Sapelo Island, Ga.

Three little tuna (Euthynnus alletteratus) were caught on trolling lines. Two were tagged and released.

Note: See Commercial Fisheries Review, April 1966 p. 38.

Transportation

UNIFORM HIGHWAY LOADING REQUIREMENTS FOR FROZEN FOODS ESTABLISHED:

A formal set of "Uniform Highway Loading Requirements for Frozen Foods" has been established by the Refrigerated Division, Common Carrier Conference, Irregular Route, and the Traffic and Warehousing Committee of the National Association of Frozen Food Packers. The requirements are for voluntary acceptance by shippers and carriers of frozen foods. Many of the carriers who handle fish as an exempt product are members of the Common Carrier Conference.

The requirements as set forth follow:

A. EQUIPMENT:

1. Trailers must be so constructed and properly insulated that, when equipped with appropriate refrigeration units, they will be capable of maintaining product at 0° F. or lower throughout the load in all movements.

2. All floor drain holes must be suitably closed to prevent air leakage.

3. Unless trailer is of envelope-type construction or uses freon or liquid nitrogen as a refrigerant, sidewalls may be stripped, racked, rippled or baffled to provide clearance for air circulation around the load. (See Section C-3.)

4. If product is loaded on pallets, no floor racks are necessary.

5. If product is loaded on extruded floors, such floors must be free from any dirt and debris.

6. Equipment must be free from any dirt, debris, and offensive odors.

7. All doors must be tight fitting to prevent air leakage.

8. It is preferred that on mechanical refrigeration units, air circulation ducts extend from the circulating fans to at least three-fourths the length of the load.

B. PRECOOLING:

1. All units must be precooled to at least 20° F. before loading.

C. LOADING AND UNLOADING:

1. Product temperature must be no higher than 0° F. when tendered at tailgate to motor carrier for loading. Shipper, consignor or warehouse must not tender to a carrier any container which has been damaged or defaced to the extent that it is in an unsalable condition.

2. Carriers must provide their drivers with appropriate testing thermometers and instruction in proper procedure to enable them to determine that product they receive is at 0° F. or lower. Arrival product temperatures will be taken inside the trailer within a reasonable time after arrival and prior to any unloading. However, the carrier must continue to protect the product until such time as the consignee is ready to accept that which the carrier is ready to tender.

Note: Technical Service Bulletin No. 7 (Revised August 25, 1965), issued by the National Association of Frozen Food Packers, entitled "Frozen Food Temperatures--Their Meaning and Measurement" describes suit-

able equipment and approved procedures for taking accurate temperatures of frozen foods.

3. No product shall be loaded in such manner that it will interfere with the free flow of air into or out of the refrigeration unit nor with the free flow of air around the load in trailers of other than envelope-type construction or those using freon or liquid nitrogen as a refrigerant.

4. It is the duty of the shipper and consignee, and not the motor carrier, to see that no product is permitted to remain on a nonrefrigerated dock longer than 20 minutes.

5. Vehicles should be loaded and unloaded within allowable free time as provided for in governing tariffs, otherwise detention charges will apply.

6. The refrigeration unit of the trailer must be turned on and doors of the vehicle kept closed during any time when loading and unloading operation cease.

7. The thermostat on the refrigeration unit must be set at 0° F. or lower.

8. Bills of lading will bear the following or similar notation: "FROZEN FOODS--To be tendered and transported at a temperature no higher than 0° F."

9. After loading has been completed and the trailer doors closed, the carrier's equipment must be checked prior to departure to make certain that the refrigeration equipment is in proper working order.

Tropical Atlantic Fisheries Investigations

BIOLOGY AND ECOLOGY OF TUNA AND LIVE BAIT INVESTIGATIONS:

R/V "Geronimo" Cruise 7 (January 24-April 20, 1966): The northeast coast of South America and the eastern Caribbean Sea were the areas covered on this cruise by the research vessel Geronimo, operated by the Tropical Atlantic Biological Laboratory, Bureau of Commercial Fisheries, U. S. Department of the Interior. Objectives were to: (1) investigate the biology and ecology of surface tunas and other pelagic predators by sampling these fish by live-bait fishing and trolling, and by investigating their relationships to the physical, chemical and biological environment, and by testing the suitability of various fishes as live bait; and (2) test the feasibility of transmitting salinity and uncorrected temperature data to a shore station for processing and the subsequent transmission of reduced data back to the vessel; a cooperative feasibility study between the Bureau of Commercial Fisheries, Coast Guard, National Oceanographic Data Center, Navy Anti-Submarine Warfare Environmental Prediction System, and the University of Miami.

INVESTIGATION OF THE BIOLOGY AND ECOLOGY OF SURFACE TUNAS: Few fish were sighted during the fishery-oceanography survey from Miami to Trinidad (January 30 to February 7) except for some concentrations of blackfin tuna (Thunnus atlanticus) seen near island banks. One large school of tuna was observed near Anguilla Island. This school was estimated to be at 30 tons consisting of 50-150 pound yellowfin tuna (Thunnus albacares), 5-10 pound skipjack tuna (Katsuwonus pelamis), and 5-10 pound blackfin tuna. The school was accompanied by a 40-foot whale shark (Rhincodon typus). The fish were feeding on large concentrations of juvenile squirrelfish (Holocentrus sp.).

Extremely rough weather was encountered between Trinidad and the mouth of the Amazon River from February 12 to March 8. Thirty-knot winds from the northeast prevailed daily and made sightings of surface schools virtually impossible. One small school of tuna (5 tons) was sighted. This mixed school of yellowfin and skipjack occurred at 8°10' N. and 56°40' W. and was accompanied by several large baleen whales.

On the return survey to Trinidad the entire track was covered during daylight hours. A few small, scattered schools of little tuna (Euthynnus alletteratus) were observed in the turbid, nearshore waters, particularly near the mouth of the Amazon. A few schools of skipjack tuna and occasional yellowfin jumpers were sighted in the clear, offshore waters. A 5-ton school of skipjack and yellowfin was found at the same locality where the whales and tuna were sighted 15 days earlier; no whales were present at this time.

The combination of unfavorable fishing weather and few sightings would indicate that at that time of year the area holds little promise for a tuna fishery.

Between March 8 and 26 a fishery-oceanography survey along the north coast of Venezuela from Trinidad to Curacao was carried out. Heavy seas prevailed during the first portion of the survey, making it difficult to sight fish. In general, it was too rough to allow the fishermen in the racks for bait fishing. As a result most fish caught during the first portion of the survey were taken on jig lines. On March 16, two 35-pound yellowfin were caught by that method.

A total of 14 scattered schools of skipjack, 4 of yellowfin, and 3 of little tuna were sighted during the survey--all were too small for commercial bait or purse-seine fishing. A total of 2 yellowfin, 8 skipjack and 7 blackfin tuna, and 1 frigate mackerel (Auxis sp.) was caught, mostly on jig lines. Many large breezing schools of blackfin tuna and frigate mackerel were seen on Margarita Bank, located 5-7 miles off the harbor of Caracas, Venezuela. The blackfin were in close association with pods of baleen whales feeding on the rich concentration of plankton over the Bank. Flyingfish and dolphin were numerous in these waters and more than 40 dolphin were hooked on jigs. The combination of rough weather and few fish indicated that the coastal and oceanic areas north of Venezuela during the month of March hold little promise for a commercial tuna fishery.

Between April 2 and 15 a fishery-oceanography survey from Curacao to Miami was carried out. Most of the effort was concentrated in the Lesser Antilles, especially in the area west of the islands of St. Vincent and St. Lucia. More than 20 schools of skipjack were sighted in a period of 10 days. Biological samples were collected from 276 skipjack sampled from these schools; this number resulted from attempts to catch a maximum of 25 fish from each school sighted and fished. Most fish were less than 12 pounds and many had nearly mature gonads. All schools sighted were of commercial quantity and behaved in a schooling fashion believed to be particularly well suited to the purse-seine method of fishing.

The western side of the Lesser Antilles is characterized by turbulent eddies formed where the islands intercept the westward moving arms of the Guiana Current. An intensive grid of bathythermograph and hydrographic, as well as biological, stations was occupied in a 550-square-mile area to determine time-space changes in the distribution of these eddies. Preliminary analysis of the distribution of temperature reveals that the eddies may be relatively permanent features and may act as mechanisms for biological enrichment, depending upon the direction of eddy rotation.

Measurements of temperature, salinity, inorganic phosphate, and oxygen were taken at depths down to 500 meters (1,640 feet) using standard Nansen bottle casts. Plankton samples, measurements of primary productivity using C-14, neuston net tows, and nightlight samples were taken. A continuous daytime watch was maintained for fish schools, birds, and mammals. The fish caught were sampled for length, weight, and sex determination; stomach contents, gill rakers, and gonads were preserved for later study. Samples for biochemical analysis also were taken from the fish. These included eye lenses, external median flank muscle, gonad, heart, liver, caecal mass, and stomach. Blood samples were taken from 100 tuna for serological analysis by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. Tissue samples were collected for analysis of possible insecticide concentration by the Bureau's Biological Laboratory at Gulf Breeze, Fla. Miscellaneous fish specimens for systematic studies were collected at a number of locations; shore collections were made at the Marquesas Keys in Florida.

INVESTIGATION OF THE BIOLOGY AND ECOLOGY OF BAIT FISHES: An unsuccessful attempt was made to collect bait fish (from January 24-27) in the vicinity of Fort Myers Beach, Fla., but bad weather hampered operations. The few fish attracted to the night light were harassed by large cobia (Rachycentron canadum).

Live bait was obtained (February 11-12) at the U. S. Naval Base, Trinidad, by fishing a lampara net during the day. The bait included Spanish sardines (Sardinella sp.), herring (Harengula sp.) and juvenile leatherjackets (Oligoplites saurus). The bait survived only 3 days because of extremely rough weather.

A total of 150 scoops of Spanish sardines was purchased (March 14) from fishermen in the Gulf of Cariaco, Venezuela. An additional supply was obtained at Punta de Araya.

Large schools of bait were common in that area. These fish survived well and proved to be good bait. Samples of the fish used as bait were preserved for future study.

COOPERATIVE (ADP) FEASIBILITY STUDY: During the fishery-oceanography survey from Miami to Trinidad hydrographic data, including uncorrected temperatures and salinities, were relayed by radio message to Miami. Temperature data were corrected and the corrected temperatures and salinities were transmitted by teletype from Miami to the National Oceanographic Data Center (NODC) in Wahington, D. C., for comparison with historical records for the area. Quality control messages were returned to the vessel. The feasibility study was successful.

Meteorological and bathythermograph (BT) data were taken daily throughout the cruise and transmitted respectively to the U. S. Weather Bureau and Anti-Submarine Warfare and Environmental Prediction System (ASWEPS).

Note: See Commercial Fisheries Review, April 1966 p. 38.

* * * * *

R/V "Undaunted" Cruise 2 (February 7-April 9, 1966): To investigate (1) the biology and ecology of surface tuna and other pelagic predators and (2) the biology and ecology of fish suitable for use as live bait for sampling tuna and other pelagic predators were the objectives of this cruise by the research vessel Undaunted of the U. S. Bureau of Commercial Fisheries Tropical Atlantic Biological Laboratory. The areas of operation were the western Atlantic Ocean adjacent to the Lesser Antilles, and the Caribbean Sea.

Fig. 1 - R/V Undaunted operated by the U. S. Bureau of Commercial Fisheries Tropical Atlantic Biological Laboratory.

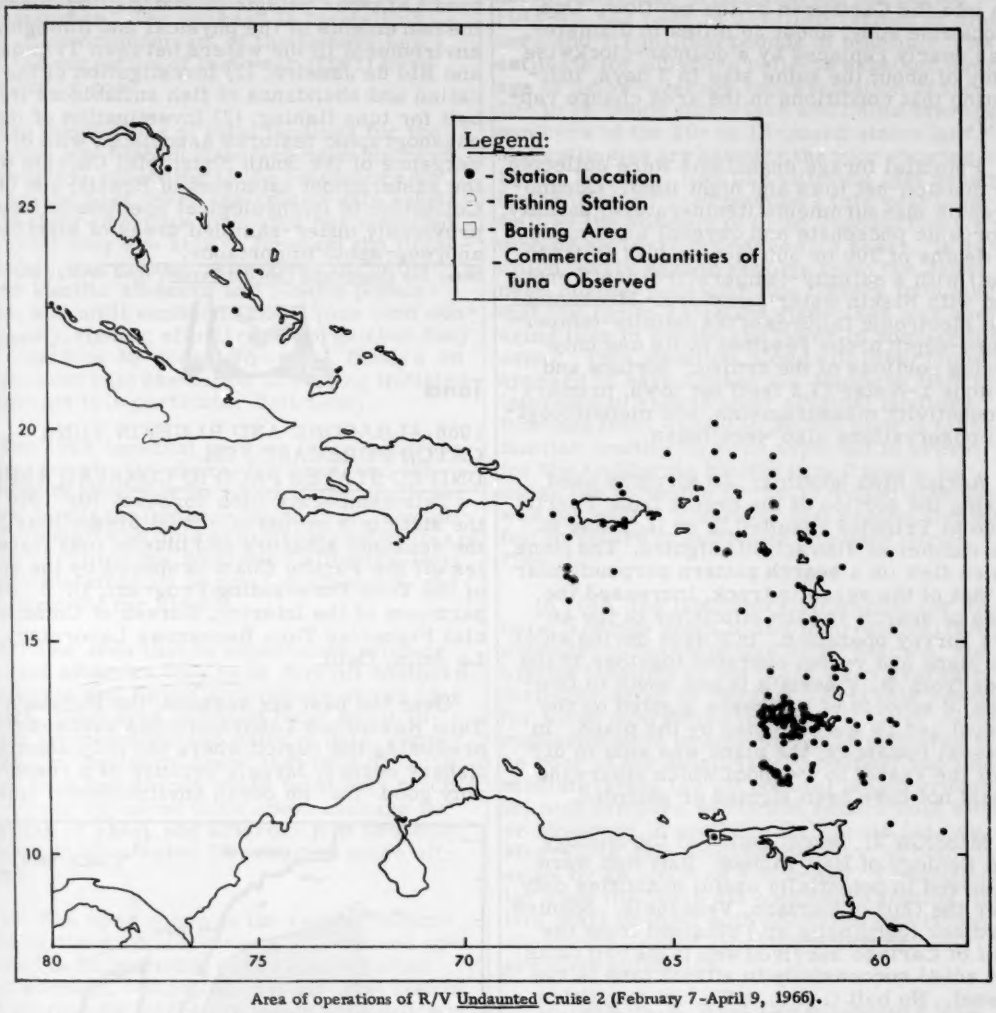
MISSION 1: Investigations of the Biology and Ecology of Surface Tuna: A total of 44 fish schools was observed during the cruise and 18 of those were sampled by live bait fishing or by trolling techniques. From those schools, 508 tuna (25 yellowfin tuna (Thunnus albacares), 483 skipjack tuna (Katsuwonus pelamis), 1 frigate mackerel (Auxis sp.), 43 dolphin (Coryphaena hippurus), 3 wahoo (Acanthocybium solanderi), 1 crevalle jack (Caranx hippos), 1 horse-eye jack (C. latus), 1 rainbow runner (Elagatis bipinnulatus), and 1 almaco jack (Seriola rivoliana) were caught.

Fig. 2 - Shows a deck sample of skipjack tuna caught by R/V Undaunted during cruise 2.

The majority of the tuna schools sighted were in the southern Lesser Antilles between Martinique and Trinidad. No schools were sighted in the Bahama Islands and only 2 schools were sighted off the southwestern coast of Puerto Rico.

Seven large schools of skipjack were sampled in a 45- by 30-mile area west of St. Vincent Island. Individual fish ranged in size from 5 to 35 pounds; most fish weighed between 5 and 12 pounds. The schools varied in size from 5 to 200 tons. In the same area one mixed school of yellowfin and skipjack tuna was sampled. The fish were located at 12°56' N. 62°04' W. and ranged in size from 30 to 160 pounds. A conservative estimate of the size of the school was 500 tons.

Biological data collected from each specimen included length, weight, sex, and stomach



Area of operations of R/V Undaunted Cruise 2 (February 7-April 9, 1966).

contents. In addition, samples of muscle, gonad, and eye lens tissue were collected from one school of skipjack tuna for electrophoretic analysis of proteins.

Small specimens (50 millimeters or 2.0 inches, total length) of the serranid Paranthias furcifer were collected in the area of the yellowfin tuna school and one of the schools of skipjack tuna. This forage species was prominent in the stomach contents and, in the latter instance, was observed swimming in dense aggregations in the area of collection.

The water properties on the eastern and the western sides of the Lesser Antilles were significantly different. Turbulent eddies in the upper 300 meters (984 feet) and increased plankton values in the upper mixed layer characterized the area west of St. Vincent Island. The greater abundance of fish schools observed in this area may be associated with these conditions. The eddies observed in this area are probably the result of currents flowing into the Caribbean Sea from the Atlantic Ocean, past St. Vincent Island and other nearby islands. The eddies appear to be carried

on into the Caribbean by the net flow. One clockwise eddy, about 30 miles in diameter, was nearly replaced by a counter-clockwise eddy of about the same size in 3 days, indicating that conditions in the area change rapidly.

Potential forage organisms were collected by neuston-net tows and night light. Oceanographic measurements (temperature, salinity, inorganic phosphate and oxygen) were made to depths of 300 or 500 meters (984 to 1,640 feet) with a salinity-temperature-depth probe and with Niskin water samplers. Mechanical and electronic failures of the salinity-temperature-depth probe resulted in its use only during portions of the cruise. Surface and oblique 1-meter (3.3 feet) net tows, primary productivity measurements, and meteorological observations also were taken.

Aerial Fish Spotting: An airplane used during the portion of the cruise from Puerto Rico to Trinidad resulted in an increase in the number of fish schools sighted. The plane, which flew on a search pattern perpendicular to that of the vessel's track, increased the area of search and the efficiency of the entire survey operation. In 6 days during which the plane and vessel operated together in the area from St. Vincent's Island south to Grenada, 6 schools of tuna were sighted by the vessel and 19 were sighted by the plane. In several instances, the plane was able to direct the vessel to a school which otherwise would not have been sighted or sampled.

MISSION 2: Investigation of the Biology and Ecology of Bait Fishes: Bait fish were observed in potentially useful quantities only near the Gulf of Cariaco, Venezuela. Spanish sardines (Sardinella sp.) obtained from the Gulf of Cariaco survived well in the bait tanks and acted successfully to attract tuna to the vessel. No bait fish in sufficient quantities were observed in the Bahamas, the Lesser Antilles, nor at Puerto Rico.

The R/V Undaunted was scheduled to start Cruise 5 on July 18, 1966. The area of operations for this cruise will be the northeast and east coasts of South America between Trinidad and Rio de Janeiro, and in the vicinity of the islands of Ilha Trinidade and Martin Vaz, Atol das Rochas, Fernando Noronha, and Roche dos Sao Paulo.

The cruise missions will be: (1) Investigation of the biology and ecology of surface tuna and other pelagic predators, together with measurements of the physical and biological environment in the waters between Trinidad and Rio de Janeiro; (2) Investigation of the location and abundance of fish suitable as live bait for tuna fishing; (3) Investigation of the oceanographic features associated with divergence of the South Equatorial Current off the easternmost extension of Brazil; and (4) Collection of ichthyological specimens from previously under-sampled areas of significant zoogeographic importance.

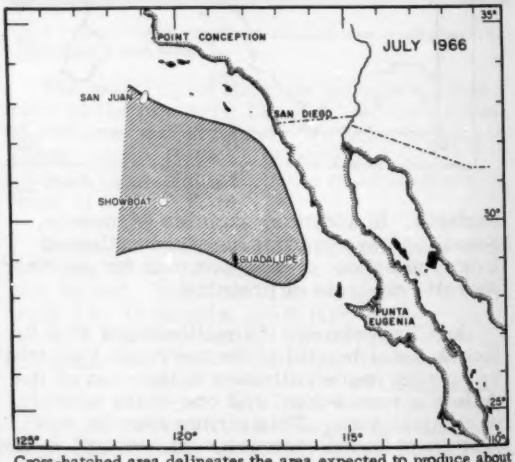
Note: See Commercial Fisheries Review, April 1966 p. 38.

Tuna

1966 ALBACORE AND BLUEFIN TUNA CATCH FORECAST FOR UNITED STATES PACIFIC COASTAL AREA:

This temperate tuna forecast for 1966 is the sixth in a series of annual predictions for the seasonal albacore and bluefin tuna fisheries off the Pacific Coast prepared by the staff of the Tuna Forecasting Program, U. S. Department of the Interior, Bureau of Commercial Fisheries Tuna Resources Laboratory, La Jolla, Calif.

Over the past six seasons, the Bureau's Tuna Resources Laboratory has succeeded in predicting the region where the July albacore fishery occurs, largely because of a reasonably good "fix" on ocean environmental condi-



Cross-hatched area delineates the area expected to produce about two-thirds of the total July 1966 albacore tuna catch off southern California and Baja California (Mexico).

tions and their changes from late spring to mid-summer. The success in foretelling time of commencement of the fishery has, with the exception of last year (1965) been reasonably good.

The predictions of total landings for the albacore and bluefin fisheries have not been noteworthy, according to the laboratory staff. During the past year, analysis of data relating to their previous forecasts has revealed that until they are able to forecast the fluctuations in year-class representation in the North Pacific albacore and bluefin populations, and until economic conditions (and consequently, fishing effort) can be predicted, they will continue to score poorly. Studies on year-class representation are being initiated to correct this particular deficiency.

The 1966 forecast carries three separate estimates of: (1) where, (2) when, and (3) how much tuna may be taken at the beginning of and during the forthcoming season. The laboratory staff was limited to making estimates of items (1-3) for the Southern California-Baja California offshore region for albacore, and only item (3) for bluefin.

(1) The area that is expected to produce the best albacore fishing in July off Southern California and Baja California is shown (see chart). That area, derived from April 10-meter temperature and salinity data, represents the "optimum area" that may produce more than two-thirds of the total July catch. Upwelling appeared to be about average for the time of year, and albacore will probably remain in blue water 20 miles or more offshore.

(2) The open ocean in the region encompassing the migratory route of albacore appeared to be warming only slightly faster than average, indicating that the first fish of the shoreward migration would probably appear in the first week of July. (Waters off Oregon and Washington began to warm appreciably from mid-April to mid-May. If this trend were to continue uninterrupted, the Pacific Northwest fishery should get off to a good start late in July.)

(3) It was estimated that July landings in southern California would be below average. This year, it was expected that about 8.6 million pounds of albacore would be taken from the region south of the U. S.-Mexico border, and about 6.0 million pounds of bluefin to the north. (Average production for the period 1945-62 has been 14.2 million pounds of albacore and 7.7 million pounds of bluefin.) The estimate for albacore reflects expected average to below-average representation of the 20- to 30-pound size-class and below average numbers of the 10- to 15-pound size-class. The estimates are based on the poor showing of 10- to 15-pound fish in California last season (returning as 20-30 pounders this year), as well as the absence of 6- to 8-pound fish (returning as 10-15 pounders this year). In addition, early season reports from the Japanese spring pole-and-line fishery indicated that the 10- to 15-pound size-class was averaging less in weight and fewer in number than usual. This situation, along with other factors, appears to have caused the Japanese fishery interests to reduce their original landings forecast from 45,000 to 30,000 metric tons. Similar conditions were expected to prevail for the California bluefin tuna fishery, because the incoming 10- to 15-pound size-class was not well represented last season and may fail to return in sufficient numbers during 1966.

In 1965, the laboratory's forecast for albacore landings south of the International Border exceeded actual landings by 60 percent, and bluefin landings to the north were overestimated by about 62 percent. Probable causes for those overestimates are: (a) year-class representation in both fisheries appeared to be poor in the small (10-15 pounds) and intermediate-sized (20-30 pounds) length groups; (b) high offshore winds and record cold weather observed in southern California for late May-early July delayed the onset of both fisheries by as much as 4-6 weeks. Consequently, when the boats did commence fishing, the late start coupled with poor fish population abundance caused landings to fall far short of previous estimates.

In 1965, U. S. West Coast albacore tuna landings would have been among the poorest on record if the Pacific Northwest fishery had not materialized. Oregon-Washington landings proved to be the best since 1948, and totaled slightly over 14.0 million pounds. Consequently, the United States total came to 37.1 million pounds, or 4.8 million pounds short of the 21-year average.

The staff of the Bureau's Tuna Forecasting Program states that its understanding of the normal progression of events during the fishing season has improved in recent years, and

that it is now better prepared to monitor environmental changes over short time intervals. Significant changes which occurred between issuance of this forecast and commencement of the fishery were reported by radio broadcasts for the benefit of the fishing industry starting June 1. In addition, as the summer season progresses, it was planned to update and project ahead the oceanographic information and catch reports so that fishermen at sea can make maximum use of the data available.

Note: See Commercial Fisheries Review, July 1965 p. 49.

U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, JAN.-FEB. 1966:

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, Jan.-Feb. 1966 with Comparisons

Area (Home Port)	Jan.		Feb.		Jan.-Feb.	
	1966	1965	1966	1965	1966	1965
	(Number)					
Issued first documents:						
New England	1	3	1	3	2	6
Middle Atlantic	1	1	-	2	1	3
Chesapeake	3	4	5	-	8	4
South Atlantic	5	3	4	5	9	8
Gulf	22	9	12	24	34	33
Pacific	10	6	10	9	20	15
Great Lakes	1	-	-	-	1	-
Total	43	26	32	43	75	69
Removed from documentation 2/:						
New England	3	1	2	5	5	6
Middle Atlantic	2	1	5	3	7	4
Chesapeake	7	1	6	4	13	5
South Atlantic	3	7	9	8	12	15
Gulf	10	6	4	10	14	16
Pacific	14	8	2	3	16	11
Great Lakes	1	2	1	1	2	3
Hawaii	1	1	-	-	1	1
Total	41	27	29	34	70	61

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.
2/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.
Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

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FIRST VESSEL COMPLETED UNDER U. S. FISHING FLEET IMPROVEMENT ACT:

Completion of the first vessel constructed with assistance of the United States Fishing Fleet Improvement Act was announced May 19, 1966, by the U. S. Department of the Interior's Bureau of Commercial Fisheries. The vessel was to be delivered to its new owners in New Bedford, Mass., and will be used to fish for scallops, groundfish, flounder, and swordfish.

Scheduled to be christened Victor, the 88-foot vessel was built at a Lake Michigan shipyard and made the trip to New Bedford via Lakes Michigan, Huron, Erie, and Ontario and the St. Lawrence Seaway.

The United States Fishing Fleet Improvement Act authorizes payment of up to 50 percent of the difference in the cost of building a vessel in the United States and in less expensive foreign shipyards. To qualify for a differential payment, a vessel must be of advanced design, capable of fishing in expanded areas, and must meet certain other conditions required by the Act.

When the Victor is finally accepted by the owners, approximately $153,000, which represents 43 percent of its $355,800 cost, will be paid by the Government and the balance by the owners.

U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-April 30, 1966, amounted to 24,355,597 pounds (about 1,159,790 standard cases), according to preliminary data compiled by the Bureau of Customs, U. S. Treasury Department. That was considerably more than the 9,599,442 pounds (about 457,116 standard cases) imported during January 1-May 1, 1965.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1966 at the 12½-percent rate of duty is limited to 65,662,200 pounds (or about 3,126,771 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

* * * * *

AIRBORNE IMPORTS OF FISHERY PRODUCTS, 1965:

Shrimp from Venezuela continued to be the main airborne fishery import into the United States during the last quarter of 1965. In 1965, airborne imports of fishery products into the United States totaled 12.1 million pounds with a value of $7.3 million. Airborne fishery imports increased 13.8 percent in 1965 as compared with 1964 when smaller quantities of

U. S. 1/Airborne Imports of Fishery Products, Oct.-Dec. 1965 and the Year 1965 with Comparisons

Product and Origin 2/	Oct.-Dec. 1965		Year 1965		Year 1964	
	Qty. 3/	Value 4/	Qty. 3/	Value 4/	Qty. 3/	Value 4/
	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000	1,000 Lbs.	US$ 1,000
Fish:						
All countries. . .	198.9	170.1	861.6	821.3	438.1	138.3
Shrimp:						
Venezuela.	416.2	291.0	9,247.4	4,809.6	7,120.4	3,486.9
Panama	103.4	73.5	918.8	606.0	1,262.9	789.4
Costa Rica	-	-	104.8	50.2	350.4	187.3
El Salvador.	-	-	28.1	19.1	170.2	102.8
Other countries . .	4.6	2.6	60.3	34.4	133.5	73.1
Total shrimp. . .	524.2	367.1	10,359.4	5,519.3	9,037.4	4,639.5
Shellfish other than shrimp:						
Canada.	0.3	0.3	25.8	9.5	316.6	175.2
Mexico.	15.4	21.9	24.1	31.8	14.4	9.9
British Honduras	98.9	162.6	270.0	345.5	368.5	337.3
Honduras	18.3	27.9	43.1	44.6	80.3	82.6
Nicaragua.	9.6	5.1	119.1	120.1	70.7	69.1
Costa Rica	2.0	2.9	15.9	16.2	62.1	54.7
Jamaica	24.4	32.0	78.1	91.4	75.6	83.4
Other countries . .	114.1	131.3	260.8	251.0	128.3	104.6
Total shellfish (except shrimp)	283.0	384.0	836.9	910.1	1,116.5	916.8
Grand total	1,006.1	921.2	12,057.9	7,250.7	10,592.0	5,694.6

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.
2/When the country of origin is not known, the country of shipment is shown.
3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.
4/F.o.b. point of shipment. Does not include U. S. import duties, air freight, or insurance.
Note: These data are included in the overall import figures for total imports, i.e., these imports are not to be added to other import data published.
Source: United States Exports & Imports by Air, FT 785, January through December 1965, U. S. Bureau of the Census.

shrimp were shipped by air from Venezuela.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consists of fresh and frozen products.

Wholesale Prices

EDIBLE FISH AND SHELLFISH, MAY 1966:

Wholesale prices for edible fishery products (fresh, frozen, and canned) were up slightly in May 1966. At 126.9 percent of the 1957-59 average, the index rose 0.3 percent from April to May. As compared with May 1965, the overall index this May was up 16.2 percent. May 1966 prices were considerably higher for all items--sharply higher for some--than in the same month a year earlier. The exception was in prices for canned Maine sardines which were at the same level as May 1965.

The subgroup index for drawn, dressed, or whole finfish rose 2.8 percent from April to May. The index rise was due largely to higher prices at Boston for ex-vessel large haddock (up 10.3 percent) because of lighter supplies, and higher prices at Chicago for Lake Superior fresh whitefish (up 33.3 percent). May 1966 prices for western king salmon (up 0.3 percent) were slightly higher than in the previous month but remained unchanged for western halibut. Supplies of those species in May were still mostly frozen and market receipts of the fresh product from the early seasonal fishery were not much more than a trickle. Compared with May 1965, prices this May were higher by 13.0 percent. Prices were higher than in the same month a year earlier for all items in the subgroup, with substantial increases for large haddock (up 37.2 percent), whitefish (up 20.6 percent). halibut (up 17.3 percent), and yellow pike (up 15.4 percent).

Shows shellfish section of New York City's wholesale Fulton Fish Market.

Lower prices in May 1966 for fresh small haddock fillets at Boston (down 6.3 percent), and shucked standard oysters (down 1.5 percent) were offset by higher prices for fresh South Atlantic shrimp at New York City (up 9.1 percent). As a result, the subgroup price index for processed fresh fish and shellfish rose 3.6 percent from April to May. As compared with May 1965, the subgroup index this May was 13.4 percent higher because of substantially higher prices for all items in the subgroup. May 1966 fresh shrimp prices were up 14.3 percent from the same month a year earlier, small haddock fillets (up 13.6 percent), and shucked standard oysters (up 12.2 percent).

The May 1966 subgroup index for processed frozen fish and shellfish rose only slightly from the previous month (up 0.7 percent). Prices were higher than in April at Boston for ocean perch fillets (up 1.6 percent) and for frozen shrimp (up 0.9 percent) at Chicago. May prices remained unchanged for frozen floun-

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, May 1966 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1957-59=100)			
			May 1966	Apr. 1966	May 1966	Apr. 1966	Mar. 1966	May 1965
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					126.9	126.5	126.7	109.2
Fresh & Frozen Fishery Products:					127.8	125.0	125.3	112.9
Drawn, Dressed, or Whole Finfish:					119.9	118.8	118.5	106.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.13	.12	101.5	92.0	89.8	74.0
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.48	140.5	140.5	140.5	119.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.87	.86	120.9	120.5	121.2	115.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.70	.53	104.4	78.3	105.9	86.6
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.75	.85	122.8	139.1	139.1	106.4
Processed, Fresh (Fish & Shellfish):					134.8	130.1	129.4	118.9
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.38	.40	91.1	97.2	94.8	80.2
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.20	1.10	140.8	128.9	123.0	123.0
Oysters, shucked, standards	Norfolk	gal.	8.00	8.13	134.9	137.0	143.3	120.2
Processed, Frozen (Fish & Shellfish):					123.8	123.0	122.8	109.4
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.49	.49	109.0	109.0	106.4	98.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.39	.39	112.9	112.9	114.3	109.9
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.33	.32	114.0	112.2	112.2	105.2
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.10	1.09	130.4	129.2	128.6	109.7
Canned Fishery Products:					125.6	129.6	129.6	103.0
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.50	124.2	124.2	124.2	91.5
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	13.69	14.85	121.5	131.8	131.8	102.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	8.00	7.63	135.7	129.3	129.3	120.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	131.5

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.
Source: U. S. Department of Labor, Bureau of Labor Statistics.

der and haddock fillets. As compared with May 1965, the subgroup index this May was up 13.2 percent. Prices were higher for all items, with the more substantial increases indicated for frozen shrimp (up 18.9 percent) and flounder fillets (up 10.3 percent).

The wholesale price index for canned fishery products dropped 3.1 percent from April to May as a direct result of lower prices for canned tuna (down 7.8 percent). Prices for canned California jack mackerel during May 1966 were up 4.9 percent from the previous month but were unchanged for canned pink salmon and Maine sardines. As compared with the same month a year earlier, the index this May was 21.9 percent higher. Prices were sharply higher than in May 1965 for canned pink salmon (up 35.7 percent) because of the very light 1966 pack; prices for canned tuna were up 18.4 percent and jack mackerel up 12.2 percent. Prices for canned Maine sardines were unchanged. (U. S. Department of the Interior, Bureau of Commercial Fisheries, Market News Service.)

FOREIGN

International

EUROPE

GROUNDFISH SHORTAGES CAUSING PROBLEMS FOR SOME PROCESSORS:

Excess processing capacity developed in the Danish and Norwegian fishing industries even though landings were maintained at a good level in 1965. Processing facilities have expanded with the growing demand for groundfish fillets and other fishery products. Now local fishermen, mainly dependent on coastal fishing grounds, are not always able to deliver enough supplies to fully utilize processing capacity. As a result, Danish and Norwegian processors have pressed for liberalization of fresh fish imports and direct foreign landings for processing. This might be a short-term solution. But the Scandinavians face competition from processors in other countries. For example, the United Kingdom receives substantial foreign landings, and depends on them to supplement domestic landings.

The downward trend in the catch-per-unit-of-effort in the main Northeast Atlantic fishing areas will add to the difficulties of countries dependent on coastal and medium-range fisheries.

INTERNATIONAL CONVENTION FOR THE CONSERVATION OF ATLANTIC TUNAS

CONFERENCE OF PLENIPOTENTIARIES DRAFTS CONVENTION:

An International Convention for the Conservation of Atlantic Tunas was agreed on by 17 nations in Rio de Janeiro, Brazil, on May 15, 1966. The Convention was drafted at a two-week Conference of Plenipotentiaries sponsored by the Food and Agriculture Organization of the United Nations (FAO). Delegations attended from Argentina, Brazil, Canada, Cuba, Democratic Republic of Congo, France, Japan, Portugal, Republic of Korea, Republic of South Africa, Senegal, Spain, the Union of Soviet Socialist Republics, United Kingdom, Uruguay, Venezuela, and the United States. Observers were present from the Federal Republic of Germany, Italy, and Poland.

The Chairman's table during a session of the Main Committee of the Conference of Plenipotentiaries on the Conservation of Atlantic Tunas, Rio de Janeiro, Brazil, May 2-14, 1966. Left to right. J. E. Carroz and A. Roche, FAO Legal Advisers; J. Z. McHugh, Chairman; Horatio Rosa, Jr., Executive Secretary of the Conference; A Miyares del Valle, FAO Technical Assistant.

The United States Delegation was headed by Dr. J. L. McHugh, Assistant Director for Biological Research, Bureau of Commercial Fisheries, Department of the Interior. The other Department of Interior members were William M. Terry, Assistant Director for International Relations, Bureau of Commercial Fisheries; and Albert H. Swartz, Assistant Chief, Division of Fishery Biology, Bureau of Sport Fisheries and Wildlife. Department of State members were Burdick H. Brittin, Deputy Special Assistant for Fisheries and Wildlife to the Under Secretary for Economic Affairs; William L. Sullivan, Jr., Foreign Affairs Officer; Raymund T. Yingling, Assistant Legal Adviser; and Richard S. Croker, United States Fisheries Attache, Mexico City. Commercial and sport fishing interests were represented by Dr. W. M. Chapman, Van Camp Sea Food Company; Charles M. Carry, Tuna Research Foundation; John J. Supple, Bumble Bee Packing Company; and Richard H. Stroud, Executive Vice President, Sport Fishing Institute.

Development of a draft Convention began in Rome, Italy, in October 1963 when FAO convened a Working Party for Rational Utilization of Tunas in the Atlantic. The Working

International (Contd.):

Party completed its assignment at a second meeting in Rome in July 1965. The Conference of Plenipotentiaries reviewed the draft prepared by the Working Party and altered the language where necessary to resolve differences of opinion.

The Convention was signed by Brazil, Spain, and the United States on May 15, 1966. The treaty will enter into force when it has been signed and ratified by seven nations. Its purpose is to plan and coordinate scientific research with the object of maintaining the maximum sustainable yield of tunas and tuna-like fishes in the entire Atlantic Ocean and adjacent seas. All species of fish caught by tuna fishing vessels, whether for food or for other purposes, are covered by the Convention.

When the Convention enters into force, a Commission will be established. Each Contracting Party will be represented by not more than three Delegates. The Commission will establish Panels on the basis of species, groups of species, or of geographic areas. The budget of the Commission will be contributed by member nations in the form of a levy of US$1,000 for Commission membership and US$1,000 for each Panel of which the nation is a member. If the budget exceeds this amount, the additional contributions will be calculated in proportion to the amount of contributions for Commission and Panel membership, the round weight of tuna caught in the Atlantic by the vessels of each nation, and the net weight of Atlantic tuna canned by each nation.

The Commission will employ an Executive Secretary and staff. Scientific studies and collection of the necessary statistics will be the responsibility of member nations, but the Commission will review and coordinate planning and may conduct studies of its own. Mechanisms were established for joint action in enforcing regulations designed to maintain the resources at levels consistent with maximum sustainable yields.

Meetings of the Commission will be held every 2 years. To guide its work in the interim a Council will be established, made up of the Chairman and 2 Vice-Chairmen of the Commission, plus not less than 4 nor more than 8 members. If Commission membership exceeds 40 nations, 2 more members may be added to the Council. (Bureau of Commercial Fisheries, June 1, 1966.)

Note: Copies of the Final Act of the Convention, as well as the Convention itself, are available from: Branch of Foreign Fisheries, Bureau of Commercial Fisheries, U.S. Department of the Interior, Washington, D. C. 20240.

INTERNATIONAL CONVENTION FOR THE NORTHWEST ATLANTIC FISHERIES

PROTOCOL CONCERNING HARP AND HOOD SEALS ENTERS INTO FORCE:

The Protocol (done at Washington, July 15, 1963) intended to bring harp and hood seals under the International Convention for the Northwest Atlantic Fisheries (ICNAF) entered into force April 29, 1966, with the official ratification of Italy. Other member countries of ICNAF had ratified previously.

Of the thirteen member countries of ICNAF, only four--Canada, Norway, Denmark, and the U.S.S.R.--have been active regularly or at intervals in the seal fishery of the northwest Atlantic in recent years. Canada's concern over the conservation of the resource was reflected in that country's proposal, informally accepted by the other countries some years ago, to observe opening and closing dates for the seal fishery.

Additional measures to conserve the seal populations were to be discussed at the annual meeting of the International Commission for the Northwest Atlantic Fisheries which opened in Madrid, June 6, 1966. Consideration was to be given to the needs for an internationally coordinated program of essential research and other matters designed to protect and develop the seal stocks. (Canadian Department of Fisheries, Ottawa, May 3, 1966.)

Note: See Commercial Fisheries Review, Sept. 1965 p. 52.

NORWEGIAN-U.S.S.R. SEALING COMMISSION

SEAL CONSERVATION IN WHITE SEA:

The Norwegian-U.S.S.R. Sealing Commission is taking steps to protect the seals in the White Sea in order to stop the serious decline in their number. Only vessels of under 100 tons are allowed to seal in the White Sea, and they are permitted only one trip a season. (U.S. Embassy, Stockholm, May 3, 1966.)

INTERNATIONAL WHALING COMMISSION

PROPOSED REGULATION OF LAND STATION WHALING IN SOUTHERN HEMISPHERE:

On May 16, 1966, the International Whaling Commission notified member countries of a

International (Contd.):

meeting June 20, 1966, in London of a Special Group to consider the regulation of the catch of whales from land stations situated south of 40° S. latitude and in other parts of the southern hemisphere. Argentina, Australia, New Zealand, the South Africa Republic, and the United Kindgom had indicated their wish to participate in the Special Group meeting. Norway and Japan had asked to be represented as observers.

The meeting of the Special Group on land stations arose out of a resolution adopted at the Seventeenth Meeting of the International Whaling Commission. In addition to considering the regulation of the catch of baleen whales by land stations, the Special Group has been called upon to study the question of a scheme for international inspection at land stations comparable to the International Observer Scheme on vessels.

The resolution proposed that the total catch limit of Antarctic pelagic whaling for the 1966/67 season and after should take into consideration the catch of Antarctic whales from land stations in the Southern Hemisphere.

For the 1965/66 season, voluntary catch restrictions at land stations were proposed. In accordance with the Commission's request, the United Kingdom stated that for the 1965/66 season, the catch of baleen whales at land stations in South Georgia would not exceed that in the 1964/65 Antarctic season. In addition, the South Africa Republic notified the Commission that the catch of baleen whales from their land stations in 1966 would be restricted to the average of the catches for the three years 1963, 1964, and 1965.

* * * * *

MEETING OF
NORTH PACIFIC COMMISSIONERS:

On May 11, 1966, the International Whaling Commission announced the draft agenda for the meeting of the North Pacific Commissioners in London, June 23-26, 1966. The draft agenda included: report of scientists on condition of North Pacific baleen whale stocks; consideration of whaling regulations for (a) fin whales, (b) sei whales, and (c) other baleen whales; report of scientists on condition of sperm whale resources; consideration of regulation for sperm whaling; and recommendations to the Commission.

INTERNATIONAL NORTHWEST PACIFIC FISHERIES COMMISSION

VIEWS OF JAPANESE DELEGATES:

The 10th session of the International Northwest Pacific Fisheries Commission (Japan-U.S.S.R.) was completed in Moscow in mid-April 1966. On their return to Japan, chief delegates Fujita (Vice President of the Greater Japan Fisheries Association) and Kamenaga (Chief, Production Division of the Fisheries Agency) held a press conference and made the following points:

1. On the question of revising the Japan-Soviet fisheries treaty, the Soviets are dissatisfied with the fact that the salmon catch quotas, which were equal between Japan and the Soviet Union at the time the treaty was concluded, have become smaller for the Soviets. However, the present treaty does not decide on the distribution ratio of fish catch, and it was not clear if the Soviets desire to revise the treaty, or if the Soviets think that there is a problem in the management of the present treaty.

2. The Japanese proposed a "two-year arrangement" on fish catch quotas, but failed to obtain a definite promise. Soviet Chief Delegate Moiseyev stated the view that the general salmon catch quotas of Japan and the Soviet Union for next year (1967) will be the same as for last year (1965), but he was strongly opposed to decide on the distribution between Japan and the Soviet Union. The Soviets have not so far expressed their view on the catch quotas of the two countries. However, it is going too far to assume that the Japanese salmon catch quota has been secured at the same level as last year (115,000 metric tons).

3. There will be comparatively fewer questions about next year's negotiations on salmon as it will be an abundant year. However, the situation will be difficult on king crabs. (Asahi, April 21, 1966.)

Note: See Commercial Fisheries Review, June 1966 p. 48.

FOOD AND AGRICULTURE ORGANIZATION

EUROPEAN INLAND FISHERIES ADVISORY COMMISSION MEETING, MAY 9-14, 1966:

Talks on electrical fishing and trout and salmon culture highlighted a session of the European Inland Fisheries Advisory Commission of the Food and Agriculture Organization which met in Belgrade, May 9-14, 1966. Fisheries experts from 16 countries were invited to the meeting.

International (Contd.):

A major theme of the symposium on electrical fishing was the use of electricity in (1) studying the density of fish populations, and (2) for control and management of inland fish stocks. Eleven papers were presented.

Proper feeding methods was the principal theme of the symposium on inland trout and salmon culture with 13 papers presented, including contributions from Japanese, American, and European fish culturists.

During the session a working party met to study the effect of water temperature on aquatic life. (Food and Agriculture Organization, Rome.)

* * * * *

SOUTHWEST ATLANTIC REGIONAL FISHING CONFERENCE:

The third meeting of the Regional Advisory Commission on Fishing for the Southwest Atlantic (CARPAS) was held in Montevideo, Uruguay, April 25-29, 1966. The Member Countries of this FAO regional fisheries body are Argentina, Brazil, and Uruguay.

A principal accomplishment of the meeting was the approval of a system to create uniform statistical reporting. This system delineates the geographical and oceanographical area for the statistical purposes of CARPAS and establishes a uniform classification of fish species by common name.

The ocean area to be covered by CARPAS extends from the Straits of Magellan north to the Caribbean shores of Brazil and eastward to the mid-South Atlantic.

A recommendation was also made that Bolivia and Paraguay be invited to join the CARPAS organization.

An intangible result of the meeting was that the participating countries had an opportunity to exchange views and discuss common and particular problems. Members of the FAO delegation hope that the meeting will stimulate the members to work harder to develop their fishing industry and resources.

Dr. Victor H. Bertullo (Uruguay), the new President of CARPAS, will preside at the next meeting to be held in Rio de Janeiro. (U. S. Embassy, Montevideo, May 5, 1966.)

SALMON

UNITED STATES-CANADIAN PACIFIC SALMON PROBLEMS:

United States and Canadian fishery officials and industry representatives met in Seattle May 17-20, 1966, to give further consideration to salmon fishing problems of common concern in the Pacific Northwest, British Columbia, and Southeastern Alaska.

The discussions in Seattle followed two previous rounds of negotiations--one held in Ottawa in April 1966 and a prior one held in Washington, D. C., in October 1965. The earlier discussions also centered around Pacific Coast salmon problems of mutual concern.

The intermingling of salmon en route to their home streams through territorial waters of both countries has led to a disagreement. The Canadian position is that to the extent possible the net-fishing limits of each country should be used as a tool to minimize the harvest by one country of salmon bound for the rivers of the other country. The position of the United States is that the two countries must not only consider the origin of the salmon caught by fishermen of the respective countries but that they must respect the historic fisheries of the two countries in seeking an equitable solution to the problem.

The Canadians suggested that the solution to the problem lay in drawing inward the seaward limits of net fishing off the coast of Alaska and in waters of northern British Columbia. It was their view that this would minimize the capture by fishermen of either country of salmon bound for streams of the other country. The Canadians presented the United States with modified lines designed to accomplish this objective. The United States maintained that their important historic fishery off the west coast of Southeastern Alaska would be eliminated by the adjustment of net-fishing lines as suggested by Canada. The United States for its part presented net-fishing lines which would draw inward the seaward limits of fishing in Southeastern Alaska, but would preserve historic fisheries found in that area. Canada was unable to accept these lines because they permitted continued interception of Canadian-bound salmon.

Because of these differences, the conference was unable to reach agreement on

International (Contd.):

adjustment of the salmon net-fishing lines in the northern area. This led to an understanding that the countries would no longer be bound by the net-fishing line agreements reached in 1957.

At the close of the conference the Canadian Delegation reserved the right for Canada to extend its fisheries seaward where appropriate in order to seek an equitable solution of the major problem of interception by fishermen of one country of salmon bound for the other which could not be resolved by attempts to reach agreement on the inward adjustment of salmon net-fishing limits. Canada gave the assurance that unrestricted high-seas fishing by Canadian fishermen would not be permitted and that due notice of changes in pertinent fishery regulations would be given to the United States.

The United States Delegation stated that in view of the Canadian reservation, the United States reserved its right to redefine its seaward salmon net-fishing lines as considered appropriate. It also indicated that due notice would be given to the Canadian authorities of any proposed changes.

The conference did agree that a research program designed to provide more information on the movement and intermingling of the stocks originating in southeastern Alaska and northern British Columbia should be initiated as soon as possible. From such research it is hoped that solutions to the unresolved problems can be found which are equitable and mutually advantageous to both countries. A coordinating committee (composed of 2 U. S. and 2 Canadian fishery officials) was named to initiate the necessary exchange of information and prepare proposals for cooperative research for the consideration of the two governments before October 1, 1966.

The conference was discussed by the Canadian Fisheries Minister before a Canadian House of Commons Committee on May 26, 1966. The Canadian Minister said: (1) while Canada has reserved the right to extend seaward the limits of net salmon fishing, no action would be taken before the 1966 season; (2) Canada would study the effect of the 1956 limitations imposed on Canadian fisheries; and (3) Government and chartered vessels to do research and tagging of salmon would be sent out immediately.

Note: See Commercial Fisheries Review, June 1966 p. 50.

SCANDINAVIAN COUNTRIES

PROPOSED FISHING LIMITS AGREEMENT FOR THE SKAGERRAK AND KATTEGAT SEA:

Delegations from Denmark, Norway, and Sweden met in Copenhagen on February 15-16, 1966, to discuss a proposed Scandinavian agreement on mutual access to the fisheries in the Skagerrak and the Kattegat Sea after the eventual extension of the fishing limits of the three countries. This was a continuation of Scandinavian discussions on the subject in Stockholm in May 1965. Since then, fishing industry organizations of those countries have held meetings to discuss the problem.

The Government delegates at the February 15-16 meeting agreed to recommend to their governments that fishing vessels from the 3 countries should continue to be allowed to fish up to a distance of 4 nautical miles from the coasts of the other countries in an area bounded by a line between Hanstholm, Denmark, and Lindesnes, Norway, and between Skagen, Denmark, and Tistlarna reef, Sweden.

At the same time, it was agreed between Denmark and Norway that traditional Norwegian fishing rights south of the line between Skagen and Tistlarna should be continued. Between Denmark and Sweden, it was agreed that a Scandinavian agreement should not affect the Danish-Swedish Convention of 1932 on fisheries conditions in the Kattegat. (Regional Fisheries Attache for Europe, U. S. Embassy, Copenhagen, February 24, 1966.)

Note: See Commercial Fisheries Review, Jan. 1966 p. 65, Dec. 1965, p. 48.

SOUTH AMERICA

DISTRIBUTION OF BOTTOMFISH OFF CHILE, PERU, AND ECUADOR:

A fishery scientist of the Bureau of Commercial Fisheries returned from a trip in March 1966 to Chile, Peru, and Ecuador and reported the following on the behavior and distribution of bottom-dwelling species:

(1) From Coquimbo, Chile, north to southern or central Peru, bottom waters at depths between 50 (164 feet) and 300 or 400 meters (984-1,312 feet) reportedly are deficient in oxygen and, consequently, demersal species are scarce in that zone. A similar situation occurs off northern Peru at depths between 30 (98 feet) and 100 meters (328 feet). The

International (Contd.):

substrate within that zone consisted of mud which is high in H_2S, which tends to plug trawl nets.

(2) Large schools of hake occur off both Chile and Peru with apparently identical behavior patterns to those occurring off Washington and Oregon. The hake rise into the surface layers at night and reform into compact schools near the ocean floor in the morning.

Fishing for hake, crew of Chilean trawler lower a net off Valparaiso.

(3) Large bottom trawl catches of hake are taken off Chile and Peru. To date, midwater trawling for hake has not been attempted with efficient gear. If this were done, however, catches would be extremely large--probably much larger than are now being taken with bottom trawls.

Australia

WESTERN AUSTRALIA FISHERIES DEVELOPMENT PROJECT ANNOUNCED:

A major British company with international interests in fisheries, shipbuilding, and other industries announced (in March 1966) plans to conduct a $1 million fisheries research and development project in Western Australia. The company has purchased a factoryship as part of the plan.

The 272-ton ship was formerly used by the C.S.I.R.O. and the Queensland Government in testing the shrimp potential of fishing grounds in the Gulf of Carpentaria. The vessel is in Exmouth Gulf, Western Australia, where the first fishing experiments will begin.

She will be mothership to a fleet of shrimp trawlers until a shore station and processing plant is built. She will then move to other grounds farther north where the process will be repeated.

In addition to processing shrimp for export, the ship will be used as a service depot for the company's fleet. While the fishing operation is in progress, local fishermen will be trained in new techniques of fishing and the fleet will be used in research.

Establishment of a tuna fishery in Western Australia is also in the company's plans.

The British firm moved into Western Australia in 1960 when it purchased a firm in Fremantle. In Sydney last year a director confirmed reports that the parent company was planning to work with Japanese interests to develop a tuna fishery in the west. In March 1966, a company spokesman announced that the plans to work with the Japanese had been canceled and that the company would go into tuna fishing on its own.

Fishing was to take place in waters north of Carnarvon and processing carried out at a port on the northwest coast. The venture, he said, could compete successfully with Japanese tuna-fishing groups already operating off Western Australia. Those groups caught about 4,500 metric tons of Western Australian tuna in 1964. (Fish Trades Review, March 1966.)

Barbados

BARBADOS FISHING ACTIVITY, 1965:

An American-owned enterprise had a reasonably successful year in 1965 in Barbados. It exported over 2 million pounds of frozen shrimp to foreign markets (principally

Barbados (Contd.):

to the United States). This firm can finally look forward to expanding its operation.

Fig. 1 - Unloading dock, office, repair shop, and parts storeroom of U.S.-owned firm in Bridgetown, Barbados. Two shrimp trawlers at the dock.

Soon the Barbados Marketing Corporation (BMC), a Government statutory board, is to enlarge existing freezing and cold-storage facilities at a cost of EC130,000 (US$76,500). The Government's reluctance to expand these facilities, lest the American firm move on to a more lucrative base of operation, apparently has been overcome by the willingness of the U. S. company to sign an agreement to provide for processing a specific number of pounds of shrimp a year for a specific number of years. The shrimp trawler fleet working out of Barbados now numbers 32 vessels and should increase.

Fig. 2 - Close-up view of shrimp trawlers at the dock in Bridgetown.

Although the catch of fish in 1965 exceeded that of 1964 and the number of operational fishing vessels increased over the same period, the Island, to meet local demand, still had to import EC$1.2 million (US$706,000) worth of processed and salted fish. That amount was in excess of the value of the local catch. With the approval of Government, local retail prices were allowed to rise to existing black market levels. Since catches are generally confined to limited periods, the firm, with a shortage of storage facilities, was unable to absorb the glut and create a more even distribution pattern. Experiments are now being made in exporting flyingfish when the catch is heavy.

Fig. 3 - Flyingfish gill-netters in foreground docked at Bridgetown.

Relief may soon be in the offing since the EC$5.0 million (US$2.9 million) four-year U. N. Special Fund Fisheries Project for the Caribbean finally got off the ground. The general aims of the project are to promote fishing industries in the area by (a) demonstrational and exploratory activities, (b) training of fisheries officers, and (c) marketing demonstrations. However, in the final analysis, to expand this important economic activity considerable capital will have to be provided for modernization of equipment and methods. (U. S. Consulate General, Barbados, April 27, 1966.)

Bermuda

U.S.S.R. STUDIES POSSIBLE FISHING BASE ON BERMUDA ISLANDS:

The Crown Lands Corporation of Bermuda received an inquiry from a Canadian firm which was investigating the possibilities of Soviet trawlers using the free port area on Ireland Island, Bermuda, as a storage and transshipment base for fish. According to the chairman of the Corporation, information about the availability of land in the free port area had been passed on to the Canadian firm. (U. S. Consul, Hamilton, May 2, 1966.)

Canada

ATLANTIC HERRING FISHERY CONFERENCE HELD IN FREDERICTON, NEW BRUNSWICK:

The potential of the herring resource and its importance to the future of Canada's Atlantic fisheries was the theme of the Canadian Atlantic Herring Fishery Conference, held in Fredericton, N. B., May 5-7, 1966. The Conference was sponsored by the Canadian Federal-Provincial Atlantic Fisheries Committee. About 25 papers covering every phase of the herring fishery were submitted for discussion at the meeting. Representatives of the fishing industry, as well as technologists, biologists, and marketing specialists attended.

Led by the Federal Deputy Minister of Fisheries, Government officials emphasized that Canada was not exploiting its Atlantic herring fishery to full advantage. An expansion in the East Coast herring catch from 400 million pounds in 1965 to between 1 and 2 billion pounds by 1975 was projected by a Canadian economist. He forecast generally favorable demand for herring products for the next 5 years.

Various aspects of catching, processing, and marketing an expanded herring catch were discussed by other Government and industry representatives. Obviously much of the expanded catch would go for industrial uses. A note of caution was injected by several scientists as well as by canning interests. They agreed that the resource was underexploited, but said more research was needed in order to predict effects of expanded exploitation and to develop appropriate management practices. (Canadian Department of Fisheries, Ottawa.)

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PROPOSED INCREASE TO 50 PERCENT IN FEDERAL SUBSIDY FOR ATLANTIC INSHORE VESSELS:

An increase in the Canadian Federal subsidy for Atlantic inshore fishing vessels to 50 percent was to be considered at a meeting in Montreal, April 27, 1966, of Federal and Provincial fishery officials. The Federal Fisheries Minister said there is a need to accelerate the construction of larger inshore vessels (35- to 55-foot class) in order to modernize the fishery.

Only large steel trawlers 85 feet and over have been eligible for a 50-percent Canadian subsidy. The allowable subsidy for other Canadian fishing vessels ranges from 25 to 40 percent.

Loan facilities for fishermen were also to be reviewed at the Montreal meeting.

In the field of credit, the major source of financing for Canadian fishermen has been Provincial loan agencies, the Federal Fisheries Minister said. In order to facilitate lending by such agencies, the Canadian Federal government is prepared to recommend such agencies as lenders under the Fisheries Improvement Loans Act. This action would provide a guarantee to Provincial lending agencies similar to that now provided to banks and credit unions making loans to fishermen. (Canadian Department of Fisheries, Ottawa, April 19, 1966, and other sources.)

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REGIONAL DIRECTOR OF FISHERIES IN THE MARITIMES AREA APPOINTED:

R. E. S. Homans of Halifax, N. S., has been appointed Regional Director of Fisheries in the Maritimes Area for the Department of Fisheries of Canada, it was announced April 18, 1966. He was the successful candidate in a Civil Service Commission promotional competition.

As Area Director of Fisheries, Homans (with headquarters in Halifax) is the senior officer of the Federal Department of Fisheries in the Provinces of Nova Scotia, New Brunswick, and Prince Edward Island. (Canadian Department of Fisheries, Ottawa, April 18, 1966.)

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SCALLOP FISHERY DOES NOT INTERFERE WITH LOBSTER SEASON IN NORTHUMBERLAND STRAIT:

No immediate change is planned in the regulations governing the scallop fishery in Northumberland Strait between Pictou County, Nova Scotia, and Kings County, Prince Edward Island, the Canadian Fisheries Minister announced April 21, 1966. The region referred to in the announcement is within Canadian Lobster Fishing District 7B.

Lobster fishermen in the district had voiced concern that scallop fishing would interfere with the lobster fishery in the May and June season. They also feared damage

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to lobsters on the grounds through the use of powerful draggers with heavy rakes or drags.

The Fisheries Minister said the decision to continue under previous regulations in the area was made only after careful and thorough investigations of the situation in District 7B. When the original complaints were received, Departmental officers began observations which included trips aboard scallop draggers to see the effect of the operation upon lobsters. There was no evidence to indicate that lobsters were being taken in scallop drags. The Fisheries Minister also pointed out that no scallop draggers have actually fished the area during the lobster-fishing season.

The Canadian Department of Fisheries will continue to keep the scallop and lobster fisheries of District 7B under close observation so that any adverse changes in the established pattern may quickly be spotted. (Canadian Department of Fisheries, Ottawa, April 21, 1966.)

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MARINE OIL AND MEAL PRODUCTION, USE, AND FOREIGN TRADE, 1964-1965:

Marine Oil: Canada's marine oil production of 58.8 million pounds in 1965 was about the same as in the previous year. A drop in herring oil output on the West Coast was about offset by higher production of herring oil on the East Coast.

Table 1 - Canadian Production of Marine Oil and Meal, 1964-1965

	1965	1964
	(1,000 Pounds)	
MARINE OIL:		
Atlantic Coast:		
Groundfish: body oil	1,977.6	1,437.8
liver oil	4,566.6	5,817.9
Herring	7,142.3	4,729.8
Seal	2,336.9	1,272.4
Other	1,015.7	605.5
Total Atlantic Coast oil	17,039.1	13,863.4
British Columbia:		
Herring	41,774.3	44,544.5
Grand Total marine oil production	58,813.4	58,407.9
FISH MEAL:		
Atlantic Coast:		
Groundfish	85,588.0	50,684.0
Herring	25,566.0	12,494.0
Other	1,860.0	1,872.0
Total Atlantic Coast meal	113,014.0	65,050.0
British Columbia:		
Herring	80,258.0	88,080.0
Grand Total meal production	193,272.0	153,130.0

Note: Marine-oil production data converted to pounds by use of factor 9.25 pounds equal 1 imperial gallon.

Exports of marine oil in 1965 were down from the high levels of 1964 due to the loss of herring oil markets in the United Kingdom. Shipments to the United States were also down.

Table 2 - Canadian Foreign Trade in Marine Oil, 1964-1965

	1965	1964
	(1,000 Pounds)	
EXPORTS:		
Cod-liver oil (all countries)	5,112.0	6,965.0
Herring Oil:		
United Kingdom	6,767.2	19,459.0
Australia	-	24.6
United States	811.2	3,807.4
Total herring oil exports	7,578.4	23,291.0
Whale Oil:		
United Kingdom	-	1,344.0
Italy	2,083.1	739.0
Netherlands	2,151.5	-
Australia	-	672.6
United States	291.7	404.9
Total whale oil exports	4,526.3	3,160.5
Other Marine Oils:		
United Kingdom	256.9	21.4
West Germany	-	33.9
Netherlands	1,490.9	-
Norway	-	2.8
Switzerland	.1	-
United States	728.8	1,216.9
Total other marine oil exports	2,476.7	1,275.0
Grand total marine oil exports	19,693.4	34,691.5
IMPORTS:		
Fish-Liver Oil:		
United Kingdom	172.6	971.8
Japan	14.5	-
St. Pierre	-	78.2
United States	73.7	-
Total fish-liver oil imports	260.8	1,050.0
Other Fish and Marine-Animal Oil:		
United Kingdom	143.9	119.9
Iceland	5,512.5	-
Norway	235.8	242.1
Chile	603.5	-
United States	1,415.6	618.4
Total other fish & marine animal oil imports	7,911.3	980.4
Grand total marine oil imports	8,172.1	2,030.4

Canadian imports of marine oils increased in 1965 due to larger purchases from Iceland.

In 1965, Canadian use of marine oil in margarine and shortening production totaled 44.7 million pounds as compared with 43.2 million pounds in 1964.

Table 3 - Canadian Foreign Trade in Fish Meal, 1964-1965

Item	1965	1964
	(1,000 Pounds)	
EXPORTS:		
Herring Meal:		
United Kingdom	4,982	4,263
United States	95,242	96,732
Total herring meal exports	80,224	100,995
Other Fish Meal:		
United Kingdom	27,121	18,598
Ireland	233	500
Netherlands	50	-
Sweden	440	203
Leeward & Windward Islands	34	32
Cuba	-	487
United States	9,783	4,163
Total other fish meal exports	37,661	23,983
Grand Total fish meal exports	117,885	124,978
IMPORTS:		
Fish Meal:		
Republic of South Africa	-	9,599
United States	143	180
Total fish meal imports	143	9,779

Canada (Contd.):

The 1965 prices for herring oil ranged from 11.4 Canadian cents a pound f.o.b. Toronto to 12.9 cents a pound.

Table 4 - Canadian Prices1/ for Herring Oil and Certain Vegetable Oils and Lard, 1965

Month	Soybean Oil	Malayan Palm Oil	Ceylon Coconut Oil2/	British Columbia Herring Oil	Lard
	(Canadian Cents Per Pound)				
January	14.91	13.7	17.9	12.8	13.7
February	15.41	14.3	18.5	12.9	14.2
March	15.49	14.7	20.2	12.9	14.4
April	15.42	15.1	20.7	12.9	14.9
May	13.99	15.2	21.8	12.9	14.1
June	12.85	14.9	21.5	12.2	14.3
July	13.35	14.2	18.4	11.5	15.5
August	13.38	13.2	16.8	11.4	15.4
September	14.00	12.8	16.1	11.5	15.8
October	14.60	13.4	17.6	11.9	15.6
November	14.73	13.4	17.9	12.1	15.3
December	14.36	13.3	17.8	12.2	15.0

1/F.o.b. Toronto.
2/Ceylon coconut oil is no longer quoted regularly as it is both high-priced relative to Malayan coconut oil and not always available.

Fish Meal: Canadian production of fish meal was up substantially in 1965 due to increased output on the East Coast. In 1965, there was a decline in exports of herring meal to the United States which was partly offset by larger shipments of other fish meal to the United Kingdom. (Agricultural Attache, United States Embassy, Ottawa, April 21, 1966.)
Note: See Commercial Fisheries Review, July 1965 p. 62.

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ATLANTIC WHALING STUDIED WITH AID OF JAPANESE VESSEL:

The #17 Kyo Maru, a 187-foot steel whale catcher vessel from Japan, arrived in mid-May 1966 in St. John's, Newfoundland, to carry out exploratory work and demonstrate modern whale-catching techniques and methods to the Canadian fishing industry. Scientists from the Canadian Federal Fisheries Department are also spending time aboard the vessel to collect and assess biological and oceanographic data. The vessel is working for the Canadian Fisheries Department under a 6-month charter ending November 15, 1966. Any whales caught will be processed at a plant in Dildo, Newfoundland. (Canadian Department of Fisheries, Ottawa, May 16, 1966.)

North Atlantic and Arctic whaling has been conducted on a relatively small scale in recent years. Total catch by all countries in that area in 1963/64 was 1,443 whales, according to the Food and Drug Administration.

Chile

FISH MEAL PRODUCTION REACHES RECORD PROPORTIONS:

In the first quarter of 1966, fish meal production in Chile totaled 73,474 metric tons, which exceeded the production of 70,579 tons for the entire year in 1965. Anchovy catches in early March 1966 declined somewhat but the fish returned after mid-March and the April catch may equal that of March. Chilean anchovy catches by month in early 1966 were (in metric tons): January--194,199; February--153,422; March--75,390. (U.S. Embassy, Santiago, April 29, 1966.)

Colombia

SHRIMP FISHERY, BUENAVENTURA, 1965:

The nascent shrimp industry, centered at Buenaventura on the Pacific coast, continued its growth during 1965 and reports that about 800 metric tons of shrimp were exported during 1965 with a value of over US$1,400,000. All Colombian shrimp are exported to the United States market. Local operators are ham-

Colombia (Contd.):

pered by overage vessels and by difficult transportation connections with the Colombian internal market. However, shrimp operators plan to increase their fleet by nearly 40 percent during 1966 by purchasing 9 new United States vessels and another 9 new vessels from Mexican builders. (U. S. Embassy, Bogota, May 6, 1966.)

Denmark

MODIFIED METHOD OF RECOVERING OIL AND SOLIDS FROM FILLETING PLANT RINSE WATER:

Danish processors are showing a growing interest in the recovery of oil and protein solids from rinse water used in herring filleting. In 1964, a centrifuging recovery process was installed in Hirtshals, a large herring fishing and processing port in Jutland. Similar machinery was ordered by other Danish firms.

In the spring of 1966, a modified recovery process was installed in a new filleting plant in Skagen. This process involves recovering the oil and protein from the filleting machine wash water by screening off the larger particles, adding chemicals to initiate precipitation, concentrating the precipitated solids containing oil and protein, recovering most of the solids in a decanter type centrifuge, and recovering the remaining solids and the oil in a disc centrifuge. Experimental operation has shown substantial profits with high rates of recovery of oil and protein and, as a byproduct, purified discharge water which does not pollute the harbor. A recovery plant of this type capable of handling 20 filleting machines is estimated to cost under US$100,000 f.o.b. Denmark. Future experiments are planned with similar equipment for precipitating stickwater from ship-and-shore fish-reduction plants. (Regional Fisheries Attache for Europe, U. S. Embassy, Copenhagen, April 27, 1966.)

Note: See Commercial Fisheries Review, February 1965 p. 58.

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FISHERY TRENDS, JANUARY-MARCH 1966:

Summary: Danish processors maintained good production of fresh and frozen fillets in the first quarter of 1966 in spite of short supplies of some species. But there was a drop in output of most other fishery products (particularly fish meal and canned and semipreserved herring) due to a general decline in landings. Average ex-vessel prices were at a high level in the first 3 months of 1966.

Catch: Landings of fish in local ports by Danish fishing craft during January-March 1966 were 15 percent less than during the same period of 1965 (table 1). Herring landings were down 44 percent. Flatfish landings decreased one-third, primarily the result of continued poor catches of plaice.

Table 1 - Danish Domestic and Foreign Landings, January-March 1966

Item	Jan.-Mar. 1966 Quantity	Change from Jan.-Mar. 1965 Percentage
	Metric Tons	
Danish Ports:		
By Danish vessels:		
Flatfish 1/	6,974	- 33
Cod	28,813	+ 6
Cod-like 2/	56,495	+288
Herring	43,131	- 44
Brisling	524	- 34
Mackerel	288	+ 5
Eels	56	+ 4
Salmon	395	- 18
Pond trout	2,304	+ 15
Other fish 3/	6,763	- 81
Norway lobster	117	- 71
Shrimp, deep-water	751	- 7
Mussel	2,367	- 48
Starfish	89	- 90
Total	149,067	- 15
By foreign vessels	43,143	- 5
Grand Total	192,210	- 13
Foreign Ports:		
By Danish vessels	404	+ 39

1/Plaice, flounder, dab, common sole, etc.
2/Haddock, coalfish, hake, ling, etc.
3/Mostly industrial fish such as sand eels, Norway pout, etc.
Source: Danish Ministry of Fisheries.

Partly offsetting the decline were increased landings of cod-like fish (mostly small haddock and whiting) which were used mainly for industrial rather than food products. Production of pond trout--which is calculated from export data--was 15 percent higher; this may cut into the supply of marketable trout available for sale during the remainder of 1966.

The substantial landings of fish in Danish ports by foreign vessels declined 5 percent. The comparatively smaller landings in foreign ports by Danish vessels rose 39 percent.

Prices: Average ex-vessel prices were generally higher during the first quarter of 1966 than in the same quarter of 1965 (table 2). Prices for plaice, one of the most important export items, were even more than

Denmark (Contd.):

the high prices in the 1965 period. Salmon prices were very firm at about US$1.15 a pound. The supply of salmon decreased as a result of the decline in the Greenland salmon catch. Among other important species, prices were higher for herring for food, Norway lobster, and industrial fish. Turbot, common sole, and deep-water shrimp brought lower prices.

Table 2 - Danish Average Ex-Vessel Prices for Selected Species, January-March 1966 and 1965

Species	1966			1965		
	Jan.	Feb.	Mar.	Jan.	Feb.	Mar.
	(U.S. Cents/Pound)					
Cod, drawn	8.1	7.5	7.0	8.0	6.9	7.0
Plaice, drawn	19.9	23.4	19.1	14.7	18.3	16.6
Industrial fish	1.9	1.8	1.8	1.4	1.5	1.5
Herring for food	7.8	5.9	5.3	4.9	4.6	4.7
Turbot	48.3	44.7	49.5	40.1	47.3	54.2
Salmon	115.2	115.8	114.3	106.6	97.7	94.1
Haddock	10.9	10.1	9.1	9.5	8.3	7.8
Coalfish	11.6	7.5	8.9	13.7	7.2	8.0
Common sole	72.5	68.9	73.8	82.3	83.9	88.1
Eel, silver	74.2	-	-	86.8	-	-
Eel, yellow	47.5	-	-	47.2	-	-
Norway lobster	58.8	49.3	55.1	46.8	41.3	35.8
Lobster	98.8	116.9	123.1	68.3	90.0	84.6
Shrimp, deep-water	33.0	30.3	28.5	43.1	34.2	29.1
Dogfish	9.9	9.1	9.5	8.0	6.1	8.5

Source: Danish Ministry of Fisheries.

Processing: Production of all major categories of processed products in January-March 1966 lagged behind the first quarter of 1965. In general, declines in production of processed fish followed the pattern of lower catches. But production of fresh and frozen fish fillets, the most important category, decreased only 1 percent. Production of herring fillets rose 5 percent, thus indicating that a larger percentage of the herring catch went into food use since total domestic and foreign landings were down.

Production of processed fish products in January-March 1966 included: 28,412 tons of fresh and frozen fillets (consisting of 15,794 tons of herring fillets, 9,453 tons of cod fillets, 1,021 tons of cod-like fillets, 1,409 tons of plaice fillets, 724 tons of other flatfish fillets, and 11 tons of miscellaneous fillets); 2,998 tons of canned fish; 1,355 tons of semi-preserved fish; 789 tons of smoked fish; 19,565 tons of fish meal; 4,113 tons of fish oil; 1,185 tons of ensilage; 2,109 tons of fish solubles; and 887 tons of miscellaneous products.

The decline in raw fish supplies spurred discussions concerning the easing of bans on direct landings in Danish ports by foreign vessels as well as surface importation of fresh plaice and other species needed by the processing plants. The Fisheries Ministry and the processing segment favor relaxation of restrictions, but the fishing segment (including the two most important associations) is mostly opposed.

Supplies from Danish landings increased and auction prices dropped during the first week in May 1966. At that time, two meetings of industry representatives and the Fisheries Ministry resulted in a decision not to further liberalize imports. (Regional Fisheries Attache for Europe, U. S. Embassy, Copenhagen, May 11, 1966.)

Greece

PROPOSED FIVE-YEAR FISHERY DEVELOPMENT PLAN:

An increase in the annual Greek fisheries catch to 200,000 metric tons by 1970 is included in a proposed 5-year economic development plan submitted to the Greek Government by an economic study group. That would be almost double the 105,000 tons landed in 1964. Most of the increase would come from distant-water fisheries. Following is a breakdown of the projected 1970 landings by type of fishery (with comparable 1964 landings in parentheses): distant-water fisheries 86,000 tons (21,000); middle-water fisheries 70,000 (60,500); coastal fisheries 18,000 (14,000); inland fisheries 15,000 (9,500); fish farming and culture 11,000 (none in 1964). Most of the projected catch increase would be for domestic consumption which is expected to increase from 145,000 tons in 1965 to 220,000 tons in 1970.

Additional fisheries investment of 2,050 million drachma (US$68 million) is called for in the 5-year plan to achieve the projected catch increase. Eighty percent of the proposed increase is marked for distant-water fisheries to provide 57 new long-range vessels with a total annual potential production of 65,000 tons of frozen fish. The remainder of the proposed investment would be used to modernize other sectors of the Greek fishing industry. The plan proposes for the Greek Government to provide about 10 percent of the new investment. (Alieia, April 1966.)

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Greece (Contd.):

PROCESSED FISHERY PRODUCTS PRODUCTION AND FOREIGN TRADE, 1965:

Summary: Greece produces small quantities of canned fish, salted fish, sea sponges, and fish meal. Fish meal production started in 1965 for the first time in Greece with the acquisition of a factoryship from the Soviet Union. Production of processed fishery products is still limited, however, and Greek imports of fishery products greatly exceed her fishery exports.

Processing: CANNING: The Greek fish-canning industry consists of two small factories (one in Thessaloniki and one at Myrina on Lemnos Island), which can sardines, mackerel, and octopus. Both also can vegetables. Two small factories (one at Chrysoupolis in Macedonia and one at Orei on Euboea Island) discontinued fish canning in 1965. Greek canned fish production in 1964-1965 is estimated as follows:

Item	1965	1964
	(Metric Tons)	
Mackerel (in oil or tomato)	22	227
Sardines (in sauce or oil	123	68
Octopus	20	46
Total	165	341

Greek production of canned fish has been decreasing because of foreign competition. The plans of the Hellenic Industrial Development Bank (ETVA) to establish a pilot fish-canning factory at Cavala have not yet materialized.

SALTING: This is done in many small, unmechanized establishments in coastal localities all over Greece, chiefly in Cavala, Thessaloniki, Volos, and on the islands of Euboea and Mitylene. The Greek Ministry of Industry, which has responsibility over fishing, has estimated salted fish production in 1965 at 4,500-5,000 tons, the same as in 1964.

SPONGES: These are Greece's most important processed fishery product, and the principal processed fishery export. According to the Ministry of Industry, Greek sponge production amounted to 69 tons in 1965, as compared with 98 tons in 1964. Decreased production was chiefly due to the difficulty in enrolling crews. Sponge fishing in 1965 was carried out in Greek, Libyan, Tunisian, and Cypriot waters.

FISH MEAL: Production of fish meal in Greece started for the first time in late 1965, when the 3,170-ton factory trawler Rea (formerly the Krylov) was purchased from the Soviets by Greek interests. About 100 tons of fish meal were produced in 1965. Another five large fishing vessels have been ordered from the U.S.S.R. by Greek interests. The first of these vessels, the 3,800-ton Thetis, was delivered in January 1966, and a second is expected to be delivered during 1966. Annual production capacity of these 3 vessels is placed at 1,000 tons of fish meal and some fish oil. (It is believed the vessels will also freeze fish.) There are no shore-based fish meal factories in Greece.

General Information: MARKETING AND RESEARCH: Work on the fish markets in Piraeus, Thessaloniki, Patras, Chalkis, and Cavala is nearing completion, and all five fish markets are expected to go into operation in 1966. Work on the fish market at Volos has been delayed, and is now expected to be completed in 1967.

Greek Law No. 4482, dated June 11, 1965, provides for the establishment by the Greek Government of an Institute for Oceanographic and Fishing Research.

Foreign Trade: EXPORTS: Greek exports of fishery products, except sponges, totaled 3,483 tons (US$1,602,400) in 1965, as compared with 3,185 tons ($1,279,800) in 1964. The difference was chiefly due to increased exports of fresh and frozen fish. Exports of canned and salted fish in 1965 were slightly higher than in 1964 (1,293 tons versus 996 tons). Sponge exports amounted to 106 tons ($2,496,900) in 1965 (of which 93 tons were bleached or otherwise processed) as compared with 114 tons ($2,529,200) in 1964.

IMPORTS: Greece imported a total of 55,084 tons of fishery products valued at $16.9 million in 1965 as compared with 44,216 tons valued at $13.2 million in 1964. Imports in 1965 included: fresh, frozen, or salted fish 24,150 tons ($8.6 million); canned fish 14,960 tons ($5.8 million); sea sponge 9 tons ($77,000); and fish and meat meals 15,965 tons ($2.5 million).

Greek fishery imports from the United States in 1965 included: canned fish 4,590 tons ($1,140,100) of which 4,382 ($1,068,300) were canned squid; and fish and meat meals 100 tons ($13,934). (U.S. Embassy, Athens, May 18, 1966.)

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Greece (Contd.):

FREEZER-TRAWLER LANDINGS, JANUARY-FEBRUARY 1966:

January-February 1966 landings of frozen fish from the Greek Atlantic trawler fleet totaled 5,085 metric tons as compared with 3,850 tons during the same period of 1965 and 3,242 tons during January-February 1964. The Greek freezer-trawler fleet was operating off Mauritania in early 1966. (Alieia, March 1966.)

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SPONGE IMPORTS RESTRICTED:

The Greek Ministry of Trade has forbidden sponge imports from August to December of each year in order to protect domestic sponge prices in Greece. Greek sponge imports during the remainder of the year will be regulated by the Ministry of Trade with the advice of the Greek fishing industry. (Alieia, April 1966.)

Iceland

EXPORTS OF FISHERY PRODUCTS, JANUARY-FEBRUARY 1966:

During January-February 1966, there was a sharp increase in exports of frozen herring, herring oil, and herring meal as compared with the same period in 1965, according to the Icelandic periodical Hagtidindi, March 1966. But exports of stockfish and salted fish showed a decrease in the first 2 months of 1966.

Icelandic Fishery Exports, January-February 1966 with Comparisons

Product	Jan.-Feb. 1966			Jan.-Feb. 1965		
	Qty.	Value f.o.b.		Qty.	Value f.o.b.	
	Metric Tons	1,000 Kr.	US$ 1,000	Metric Tons	1,000 Kr.	US$ 1,000
Salted fish, dried	734	16,963	394	1,066	21,913	508
Salted fish, uncured	407	7,817	181	867	14,462	336
Salted fish fillets	298	5,850	136	297	5,772	134
Wings, salted	-	-	-	44	600	14
Stockfish	1,511	48,331	1,121	2,089	60,811	1,411
Herring on ice	1,245	5,903	137	-	-	-
Other fish on ice	5,354	39,484	916	6,905	42,641	989
Herring, frozen	10,146	65,771	1,526	5,880	37,640	873
Other frozen fish, whole	1,108	17,090	396	1,259	14,522	337
Frozen fish fillets	2,634	78,119	1,812	2,166	48,774	1,132
Shrimp and lobster, frozen	82	8,361	194	73	6,523	151
Roes, frozen	520	5,685	132	183	2,825	66
Canned fish	186	6,551	152	76	3,964	92
Cod-liver oil	932	10,075	234	1,047	11,555	268
Lumpfish roes, salted	-	-	-	-	-	-
Other roes for food, salted	-	-	-	-	-	-
Roes for bait, salted	656	5,046	117	-	-	-
Herring, salted	5,793	73,399	1,703	5,006	53,765	1,247
Herring oil	13,638	106,057	2,461	3,931	31,902	740
Ocean perch oil	-	-	-	-	-	-
Whale oil	-	-	-	774	6,698	155
Fish meal	1,263	10,004	232	754	4,878	113
Herring meal	24,952	206,792	4,798	14,823	101,935	2,365
Ocean perch meal	36	275	6	-	-	-
Wastes of fish, frozen	452	1,893	44	597	1,881	44
Liver meal	18	131	3	94	666	15
Lobster and shrimp meal	-	-	-	25	124	3
Whale meal	-	-	-	311	1,889	44
Whale meat, frozen	-	-	-	10	80	2

Note: Values converted at rate of 1 krona equals 2.31 U.S. cents.

During the first 2 months of 1966, Iceland's exports of frozen herring totaled 10,146 metric tons, valued at US$1,526,000, as compared with 5,880 tons, valued at US$873,000, during the same period of 1965. Exports of herring oil totaled 13,638 tons, valued at US$2,461,000, as compared with 3,931 tons, valued at US$740,000, during January-February 1965. Exports of herring meal totaled 24,952 tons, valued at US$4,798,000, as compared with 14,823 tons, valued at US$2,365,000, during the same period of 1965.

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EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, MARCH 31, 1966:

As of March 31, 1966, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 4,947 metric tons, about the same as the 5,156 tons on hand March 31, 1965. (United States Embassy, Reykjavik, May 2, 1966.)

Icelandic Export Stocks 1/ of Principal Fishery Products, March 31, 1966

Item	Qty.	Value	
	Metric Tons	Million Kr.	US$ 1,000
Groundfish, frozen: for export to:			
U. S.	4,947	128.6	2,986.5
other countries	3,980	73.9	1,716.2
Stockfish	1,250	41.3	959.1
Herring, frozen	822	5.2	120.8
Industrial products: fish meal:			
herring	10,119	85.0	1,974.0
other fish	17,431	125.7	2,919.2
herring oil	14,738	119.4	2,772.9

1/Includes only stocks intended for export.
Note: Icelandic kronur 43.06 equal US$1.00.

United States imports of frozen groundfish fillets from Iceland in the year 1965 totaled 21,384 metric tons of groundfish blocks and slabs, 3,850 metric tons of cod fillets, 2,660 metric tons of haddock fillets, and 478 metric tons of ocean perch fillets. Iceland is second only to Canada as the leading supplier of groundfish fillets and blocks to the United States.

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FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-DECEMBER 1964-1965:

Species	Jan.-Dec.	
	1965	1964
	(Metric Tons)	
Cod	243,702	280,703
Haddock	53,676	56,689
Saithe	24,730	21,793
Ling	5,157	4,990
Wolffish (catfish)	7,598	8,289
Cusk	2,260	3,542
Ocean perch	29,910	27,707
Halibut	989	1,205
Herring	762,867	544,396
Capelin	49,735	8,640
Shrimp	902	542
Other	16,778	13,775
Total	1,198,304	972,271

Note: Except for herring which are landed round, all fish are drawn weight.

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Iceland (Contd.):

USE OF FISHERY LANDINGS, JANUARY-DECEMBER 1964-1965:

How Used	Jan.-Dec.	
	1965	1964
	(Metric Tons)	
Herring and Capelin[1] for:		
Oil and meal	714,689	468,916
Freezing	32,961	26,553
Salting	61,081	57,298
Fresh on ice	2,950	-
Groundfish[2] for:		
Fresh on ice	37,357	39,892
Freezing and filleting	183,336	183,849
Salting	88,439	89,686
Stockfish (dried unsalted)	54,226	84,118
Canning	952	297
Oil and meal	3,155	3,686
Crustaceans for:		
Freezing	4,417	3,732
Canning	190	198
Home consumption	14,551	14,046
Total production	1,198,304	972,271

1/Whole fish.
2/Drawn fish.
Source: Hagtidindi, March 1966.

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MINIMUM SIZE LIMIT FOR HERRING ESTABLISHED:

Iceland is protecting herring stocks with a new regulation banning catches of herring under 23 cm. (9 inches). Object of this Ministry of Fisheries regulation is to protect the south coast herring stocks (caught mainly in winter) which appear to have diminished. (Fishing News International, April 1966.)

Ireland

FISHERY TRENDS:

Over 22,000 schoolgirls in Ireland competed in a recent national fish cookery competition. This is an example of the market promotion work that is increasing fish consumption in Ireland.

U. S. interests intend to set up a shellfish plant on the west coast of Ireland. Initially the group will buy shellfish from Irish fishermen for processing, but later may operate its own fleet of vessels. (The Fishing News, London, May 6, 1966.)

Italy

IMPORT DUTY ON FROZEN TUNA:

According to information received by Japanese trading firms in the spring of 1966, the Government of Italy has decided to place the following import duties on frozen tuna:

1. Imports up to 14,000 metric tons a year will be admitted duty free.

2. Imports between 14,000-40,000 metric tons will be dutiable at 0.5 percent ad valorem.

3. Imports exceeding 40,000 metric tons a year will be dutiable at 15 percent ad valorem.

Previously, imports of frozen tuna up to 40,000 metric tons were admitted duty free. In recent years Japanese exports of frozen tuna to Italy have been averaging about 30,000 metric tons a year. (Note: April 1965-March 1966 exports totaled 35,323 metric tons, as compared to 28,866 tons for the previous comparable period.)

Reportedly, frozen yellowfin tuna (dressed without tails) transshipped to Italy early in April were bringing c.i.f. US$620 a metric ton and big-eyed tuna (d.w.t.) about $580 a ton. The prices were said to have declined $10-15 per ton in late April and early May reflecting the softening of market conditions in the United States. (Suisan Tsushin, May 4 & 9, 1966.)

Japan

CATCH OF SMALL ALBACORE TUNA CAUSES PRICE DROP:

The Japanese summer albacore fishery was off to a slow start in 1966, with very light landings reported as of early April. No sizable run was expected to develop until late April. As a result, a number of skipjack vessels that had been re-outfitted for albacore fishing switched back to skipjack fishing and a few shifted to long-line fishing in the southwest Pacific in April.

Albacore began appearing in the fishery in late March and a delay in their appearance, with one or two exceptions, has indicated a poor run. This has led some observers to

Japan (Contd.):

predict an unfavorable season this year, with the season's landings possibly 30,000 metric tons or less, compared to about 45,000 tons landed last year.

In spite of this unfavorable supply outlook but because of the appearance of unusually small fish, Japanese albacore export prices fell rapidly in April with buy offers for ship-frozen (long-line-caught) round albacore coming in at around US$400-410 a short ton f.o.b. The somewhat unusual catches of small albacore (averaging about 15 pounds with a large number of 10-lb. fish) taken by pole-and-line gear off northeastern Japan were being exported at about $330 a short ton f.o.b., substantially below the ship-frozen catches due to their 20-25 percent lower recovery rate. Pole-caught albacore in early April were sold ex-vessel at 120-130 yen a kilogram (US$302-328 a short ton). It was anticipated that, if the downward price trend continues, the summer albacore price may range around $360-370 a short ton f.o.b. (about 10 percent below the price for long-line catches).

To cope with the declining albacore export price, the Japan Frozen Tuna Producers Association, at a meeting held April 15, discussed the need for industry to cooperate in holding at a high level the price for the pole-caught summer albacore and to possibly avoid exporting the early season pole-caught albacore, since its lower recovery and low ex-vessel price were believed to be contributing to the decline in albacore prices. (Suisan Tsushin, April 5, 13, 18, 1966.)

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SUMMER POLE-AND-LINE ALBACORE FISHERY REPORTED SLOW:

The Japanese summer pole-and-line tuna fishery as of May 7, 1966, was very slow. Fishing usually begins picking up in late April and early May and the slowness was attributed by many to the temperature of the surface water layer, which was too cold.

If the summer pole-and-line fishery does not pick up, this may tend to drive up the price of ship-frozen long-line-caught albacore. Further, in view of the decline in the number of Japanese tuna vessels in the Atlantic Ocean, some Japanese circles feel that the combination of these developments may serve to bring about a sharp upswing in the albacore price. (Earlier press reports indicated Atlantic fleet expected to decline to about 60 vessels during May-July 1966. In March the fleet totaled 74 as compared to 155 vessels in March 1965.) However, as of early May, United States packers were reported still showing little interest in buying Japanese tuna. (Suisan Tsushin, May 7, 1966.)

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FISH LANDINGS IN YAIZU:

March 1966: Fish landings at the Japanese fishing port of Yaizu (principal tuna port) totaled 17,818 metric tons valued at 2,442.2 million yen (US$6.8 million), according to data compiled by the Yaizu Fishery Cooperative Association. This was an increase of 4,398 tons and 1,019.9 million yen ($2.8 million) over the same period in 1964. (Kanzume Nippo, April 7, 1966.)

Yaizu Fish Landings, March 1966 with Comparisons

Species	March			
	1966	1965	1966	1965
	Quantity		Avg. Value	
	. . (Metric Ton) . .		($/Short Ton)	
Tuna:				
Bluefin	6,949	5,691	486	393
Albacore	1,482	930	431	307
Skipjack	6,538	3,456	257	176
Mackerel	2,131	2,642	108	104
Other fish	718	701	-	-
Total	17,818	13,420	-	-

* * * * *

April 1966: Landings of fish at the Japanese port of Yaizu totaled 20,197 metric tons valued at 2,288 million yen (US$6.4 million) as compared to March landings of 17,818 metric tons valued at 2,442 million yen ($6.8 million), according to data compiled by the Yaizu Fishermen's Cooperative Association. Albacore landings showed a sharp decline but landings of both skipjack and mackerel showed significant increases. Skipjack landings were double those of April 1965. A large portion

Table 1 - Yaizu Fish Landings and Average Values, April 1966 with Comparisons

Species	Quantity			Average Value		
	1966		1965	1966		1965
	April	March	April	April	March	April
	. . (Metric Tons) . .			. (US$/Short Ton) .		
Tuna:						
Bluefin 1/	6,373	6,949	7,011	521	486	390
Albacore	2,647	1,482	4,684	376	431	314
Skipjack	5,293	6,538	2,646	265	257	274
Mackerel	5,234	2,131	3,711	88	108	102
Other fish	650	718	665	-	-	-
Total	20,197	17,818	18,717	-	-	-

1/Includes yellowfin and big-eyed tuna.

Japan (Contd.):

Table 2 - Yaizu Fish Landings and Values, January-April 1966 with Comparisons

Species	Quantity		Value	
	1966	1965	1966	1965
	(Metric Tons)		(US$1,000)	
Tuna:				
Bluefin 1/	24,977	23,809	13,192	9,855
Albacore	5,788	7,082	2,472	2,290
Skipjack	15,146	7,111	4,164	1,609
Mackerel	11,398	7,281	1,274	838
Other fish	2,898	2,732	776	663
Total	60,807	48,015	21,878	15,255

1/Includes yellowfin and big-eyed tuna.

of the catch was being purchased by Katsuobushi (dried skipjack loin) processors. In early May they were reported paying prices ranging from 70 to 100 yen a kilogram ($176-252 a short ton). (Kansume Nippo, May 7; Suisan Keizai Shimbun, May 5, 1966; and other sources.)

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TUNA FISHERMEN PLAN TO MEET WITH KOREANS AND CHINESE:

The Japan Federation of Tuna Fishermen's Associations (NIKKATSUREN), as one of its major projects for the year, plans to meet with representatives of the tuna fishing industries of the Republic of Korea (ROK) and Taiwan to discuss problems affecting the three countries. NIKKATSUREN considers it necessary to maintain close communication with the industry members of those two countries in view of their rapidly developing tuna fisheries, and to resolve common problems relating to resources, stabilization of tuna prices, labor, and wages. The organization's Vice President reportedly has already sounded out the views of the ROK and Taiwan fishery representatives during their earlier visits to Japan and has received their pledge of cooperation. (Suisan Keizai Shimbun, April 12, 1966.)

* * * * *

ATLANTIC TUNA FISHING AND MARKETING TRENDS:

The number of Japanese tuna vessels operating in the Atlantic Ocean totaled 74 vessels, as of March 31, 1966, compared to 155 vessels in March 1965 and 159 vessels during the peak of operations in 1964. Based on April 1966 operating plans, the Japanese tuna fleet was expected to further decline to about 62 vessels in May-June and 59 in July. The withdrawal of Japanese vessels from the Atlantic Ocean was expected to greatly affect the supply of Atlantic tuna available for export to the United States. Landings at Atlantic bases were down to around 5,000 metric tons per month, with the number of vessels landing fish averaging about 20 a month. It was anticipated that at that rate, transshipments of Atlantic tuna in business year 1966 (ending March 31, 1967) may not exceed 60,000 metric tons, or 80 percent of the 1965 transshipments of 75,000 tons.

Composition of the Japanese Atlantic tuna fleet and export trends during the past three years were:

Year	No. Vessels Operated		Transhipments
	High	Low	Metric Tons
1965	152	74	75,027
1964	159	110	94,640
1963	105	86	86,868

In view of the reduction of the Atlantic tuna fleet and indications of further vessel withdrawals, observers in Japan foresee a supply shortage of Atlantic tuna more acute than that which occurred in late 1965. Thus, despite the tuna price decline, they anticipate a definite upswing in prices again in the near future. Cessation of United States buying of Japanese albacore for direct export from Japan since the beginning of April was viewed as only a passing phenomenon attributed to the temporary decline in canned tuna sales in the United States and to the withholding of buy offers by United States packers pending further development of the Japanese summer albacore fishery. (Suisan Tsushin, April 23 and 26, 1966.)

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MARKET VALUE OF TUNA FISHING LICENSES INCREASES:

Japanese tuna fishing licenses, which are freely sold at a premium on the open market in Japan, were reported selling for around 240,000 yen (US$667) a vessel ton, compared with a low of 120,000 yen ($333) in late 1965. The rise in premium, which began in early 1966 (average of $417 offered in January and $500 in February-March) was attributed to improved economic conditions in the fishery. The highest postwar premium paid for a tuna license was 420,000 yen ($1,167) a vessel ton in late 1962. (Suisan Keizai Shimbun, April 12, 1966.)

* * * *

Japan (Contd.):

EX-VESSEL PRICES FOR TUNA AT INDIAN OCEAN BASES:

The company which operates the cannery at Penang, Malaysia, and the Japanese association representing vessel owners operating tuna long-line vessels out of overseas bases reached a new price agreement on tuna delivered to Penang, Malaysia, and Port Louis, Mauritius Island. The agreement covered

Prices for Tuna Delivered to Penang, Malaysia, and Port Louis, Mauritius Island, April 1-May 31, 1966

Species	Penang		Port Louis	
	Yen/Kg.	US$ Short Ton	Yen/Kg.	US$ Short Ton
Albacore, round, over 25 lbs.	160	403	145	365
Yellowfin, G. & G., all sizes	150	378	135	340

the period April 1-May 31, 1966, and provided for an increase in price of 15-20 yen a kilogram (US$38-50 a short ton) for tuna landed at the two bases. (Suisancho Nippo, March 26, 1966, and other sources.)

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TUNA FEDERATION PLAN TO STABILIZE EX-VESSEL ALBACORE PRICES:

At a meeting held March 15, 1966, the National Federation of Tuna Fishermen's Associations (NIKKATSUREN) adopted a plan aimed at preventing a collapse of ex-vessel albacore prices during the 1966 summer pole-and-line fishing season. Under the proposed plan, NIKKATSUREN would purchase albacore when there should be very heavy landings and if there is danger that prices might drop suddenly. The fish would be held in cold storage and released either for export or for domestic use at such time when their release will not disrupt market conditions. NIKKATSUREN planned to approach the Fisheries Agency and those engaged in the tuna business to seek support for its plan. (Katsuo-Maguro Tsushin, March 18, 1966.)

* * * * *

TUNA FEDERATION RECOMMENDATIONS FOR GOVERNMENT ACTION:

The Japan Federation of Tuna Fishermen's Associations' (NIKKATSUREN) Vice President presented two recommendations to the Liberal Democratic Party's Distant-water Fisheries Promotion Subcommittee Chairman, urging enactment of favorable administrative measures for the tuna fishing industry. The gist of the recommendations was reported to be as follows:

I. Priority Measures to Promote Stable Growth of the Tuna Fishery

A. The Government should lower interest rates on existing fishery loans from the current 7.5 percent to 6.5 percent and should reduce interest rates on new loans from purchase, construction, or conversion of vessels from 7.5 percent to 5.5 percent. It should also raise the loan ceiling of 60 percent of the total cost of the vessel, or a maximum loan of 80 million yen (US$222,222) per vessel, to 70 percent of the cost or a maximum amount of 120 million yen ($333,333) per vessel. Loan interest charged by the Agriculture-Forestry Center Cooperative Bank (semi-government controlled) should be reduced from the current 8.7 percent on existing long-term loans (totaling about 270 billion yen or $75 million) to 7.5 percent and on new long-term loans to 6.5 percent.

B. To facilitate incorporation and business expansion of independent fishery enterprises, the Government should withhold assessment of incorporation tax, establish a separate category for government loans, and adopt other tax reducing methods.

C. The Government should provide NIKKATSUREN with funds needed to purchase vessels and equipment of enterprises faced with bankruptcy, thereby preventing the occurrence of successive bankruptcies among other financially-distressed enterprises.

II. Basic Plan (Preliminary) to Promote Development of the Tuna Fishery

In order to stabilize and strengthen the management of the tuna fishery, it is essential that the fishery resources be effectively utilized, operations be modernized and rationalized, and the structure of the industry be developed to a higher degree, thereby strengthening Japan's international competitive position. To attain these objectives, the following is recommended:

A. Tuna Production and Export Targets for 1971

1. Tuna production target:

Fishery	Quantity	Value	
	Metric Tons	Million Yen	US$1,000
Tuna, long-line . . .	360,000	74,160	206,000
Skipjack, pole & line	211,000	26,800	74,444
Total	571,000	100,960	280,444

2. Tuna export target:

Product	Quantity	Value	
	Metric Tons	Million Yen	US$1,000
Frozen	263,000	38,250	106,250
Canned	121,000	20,150	55,972
Total	384,000	58,400	162,222

3. Principal measures to be implemented:

a. A total of 155 tuna vessels to be transferred from the long-line fishery to the skipjack pole-and-line fishery.

b. The number of tuna motherships carrying 1-2 portable boats to be increased by 50.

Japan (Contd.):

c. The overseas-based tuna fleet to be increased by a total of 112 vessels, and overseas-based vessels to be allowed to transship their catches on the high seas, thereby increasing efficiency.

d. To promote export trade, loans to trading firms to be administered on a sound basis, excessive inter-firm competition eliminated, and an export sales system firmly established.

B. Fleet Modernization (Organization) Target for 1971

1. Target (No. of Vessels):

Tuna long-line vessels	581
Skipjack pole-and-line vessels	374
Portable-boat carrying motherships	88 (76,000 gross tons)
Seasonal tuna vessels	90 (8,000 " ")
Total	1,133

2. Area of Operation:

Ocean	Types of Vessels	
	Long-line 1/	Pole-and-line
Atlantic	130 (43)	30
Indian	160 (100)	10
Pacific	469 (180)	334
Total	759 (323)	374

1/Figures in ( ) give number of vessels operating out of overseas bases.

(Suisancho Nippo, March 24, 1966.)

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REPORT ON GOVERNMENT-INDUSTRY TUNA SYMPOSIUM:

The 1966 Japanese Government-industry symposium on the tuna fishery, sponsored by the Japan Scientific Fisheries Council and supported by the Japan Federation of Tuna Fishermen's Associations (NIKKATSUREN), was held in Tokyo, April 5-6, 1966. The symposium, chaired by the Director, Nankai Regional Fisheries Research Laboratory, featured discussions on scientific papers on tuna resources, fishing grounds, and gear and fishing methods, contributed by Government and industry fishery researchers.

The initial discussion centered on the resource problem. Industry asked what type of gear--long-line, purse seine, or pole and line--would be better from the standpoint of maintaining the resources. A researcher from the Nankai Laboratory replied that from the viewpoint of resources, a gear which captures young fish was not desirable.

NIKKATSUREN's managing director asked if Japanese research and investigation have made any progress on the pending question of whether the eastern Pacific yellowfin belonged to an independent population separate from the yellowfin fished by the Japanese in the western Pacific. Noting the need for biological data at future international meetings, he also asked what kind of studies, including length frequency and serological studies, have been made on this species. Referring to reports on the declining hook rate in the Atlantic Ocean, he urged that Japanese scientists assemble detailed catch data since Japan will likely be placed under great pressure should the time come when the Atlantic tuna resources come under close scrutiny.

The discussion then turned to fishing grounds. Industry asked for detailed data on tuna resources in waters south of Australia and also inquired whether there was any possibility of developing new tuna-fishing grounds. Professor Uda introduced research data on tuna resources in southern Australian waters and Uemura (Nankai Laboratory) and Kawasaki (Tohoku Laboratory) explained that there were virtually no new fishing grounds that could support a tuna long-line fishery. It was pointed out that even if new grounds were developed, sustained working of those areas could conceivably affect availability in existing grounds. This discussion brought out the need to correlate the two factors.

In discussing the possibility of developing new skipjack fishing grounds, the scientists felt that, since most of the Japanese skipjack fishermen operate on a small scale, employing simple pole-and-line gear, there was still much room for exploiting the widely ranging skipjack, dense schools of which are found off Japan, Marianas, Ceylon, Madagascar, Hawaii, and in the eastern Pacific. It was pointed out that reliance on the primitive pole-and-line fishing gear, which catches mainly 2-year-old fish and some 3-year olds, should be restudied since 4- to 5-year old fish are believed to be available in fairly great quantity and gear improvement could substantially increase production. Professor Inouye of Tokai University explained that exploratory cruises to the central south Pacific indicated good possibilities of exploiting skipjack in waters off Truk, Mariana and Marshall Islands.

Concerning the tuna resources, Uemura explained the expansion of Japanese tuna long-line operations, in the past 10 years or

Japan (Contd.):

so, from the northwest Pacific to the Indian and Atlantic Oceans, and noted the steady rise in catch from 110,000 metric tons in 1952 to over 530,000 tons in 1962. He pointed out, however, that, despite the rapid expansion in fishing operations, resources in the fishing areas began to decline perceptibly, and production, after peaking in 1962, started to fall off. It was also stated that Japanese research and investigation lagged far behind the rapid changes occurring in the fishery and resources.

Yellowfin: Based on Nankai Laboratory's tuna data up to 1962, Uemura noted that fishing intensity continued at a very high level in 1962 and that even if efforts were increased beyond the 1962 level, an increase in overall catch could not be expected. Systematic research and investigation of the tuna resources in the eastern Pacific, conducted by the Inter-American Tropical Tuna Commission, indicate that maximum sustainable yield in the eastern Pacific is around 80,000 tons a year. This quantity was reported to be somewhat more than the total yearly Japanese long-line catch of yellowfin for the entire Pacific Ocean. Mimura noted a marked decline in hook rate in the Indian Ocean since the beginning of operations in that ocean. Nakagome reported that hook rate in the Atlantic Ocean showed a marked decline since the commencement of Japanese Atlantic operations. Reproduction, mortality, and hook rates estimated by Tetsu for the years 1957 to 1963 brought out that increased fishing effort beyond the 1963 level could not be expected to increase production. Catch statistics by fishing grounds, prepared by Shiozawa and his colleagues, show that since 1961 catch has declined considerably despite increased fishing effort.

Big-eyed: Research on this species so far has been confined to the Pacific Ocean. Data compiled by Suda, Nakagome, and Kume on the annual variation in hook rate for the eastern Pacific, where big-eyed distribution is heavy, show a marked decline since 1961. Suda's study clearly shows evidence of a declining trend from 1961 when Japanese fishing operations began to expand to the eastern Pacific off the American continent. Analysis of resource trends based on data up to 1962 indicate that the fishing effort in 1960-61 approached the level of maximum yield. Thus, caution was expressed with regard to increasing the fishing intensity beyond the 1961-62 level.

Albacore: Several papers on the mechanisms of yearly change in the Pacific albacore population in the Northern Hamisphere, contributed by Suda, showed wide changes in fishing effort and population size. However, over the entire period of fishing operations, a stabilized situation was observed and the yearly change in population size was primarily attributed to changes in the occurrence of recruitment. The survival rate of albacore was estimated to be around 70 percent but fishing intensity was believed not to have reached a very high level. Otsu, in explaining the albacore population off the U. S. coast, stated that it was difficult to believe that fishing has had any significant effect on the resource inasmuch as no declining trend has been observed.

Bluefin: Nakamura, Yamagami, and Ito, in their report on the state of the bluefin resource off Japan, noted a prolonged cyclical change in fishing conditions, which was believed to be due to environmental factors. Research by Nakamura and Yamanaka into the yearly changes in the length frequency of bluefin indicated a possible close correlation between change in fishing conditions and appearance of a dominant year-class group. (Katsuo Maguro Tsushin, April 8, 11, & 13, 1966.)

Note: See Commercial Fisheries Review, April 1966 p. 61.

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EXPORTS OF FROZEN TUNA TO U. S. AND CANADA, APRIL 1965-MARCH 1966:

Data released by the Japan Frozen Foods Exporters Association show that in business year 1965 (April 1965-March 1966) frozen tuna (round, gilled and gutted, dressed without tail, fillets and loins) approved for export to the United States and Canada from Japan proper totaled 66,223 short tons valued at US$25.7 million as compared to BY 1964 exports of 57,324 tons valued at $21 million. Transshipments from overseas bases to the United States and Canada totaled 50,180 short tons valued at $14.4 million as compared to BY 1964 exports of 36,334 tons valued at $10.5 million. The increase in transshipments of 13,846 tons was primarily accounted for by albacore, which showed an 11,148-ton gain.

Exports of frozen tuna to countries other than the United States and Canada totaled

Japan (Contd.):

49,293 metric tons valued at $19.1 million as compared to the previous year's exports which totaled 56,320 tons valued at $20.6 million. Italy was again the principal customer for Japanese tuna. Her purchases totaled 35,323 metric tons valued at $14.9 million, an increase of 6,457 tons over BY 1964 purchases, which totaled 28,866 tons valued at $10.8 million. (Suisan Tsushin, May 4, 1966.)

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EXPORTS OF FROZEN TUNA TO COUNTRIES OTHER THAN U. S., APRIL 1965-MARCH 1966:

Exports of Japanese frozen tuna to countries other than the United States in business year 1965 (April 1965-March 1966) exceeded 46,000 metric tons, valued at US$17.6 million, according to preliminary data from the Japan Frozen Foods Exporters Association. Exports to Italy (excluding February 1966) totaled 32,148 metric tons, exceeding the previous year by 4,000-6,000 tons. Exports to Yugoslavia declined drastically, to about one-third of the previous year, while exports to Spain increased 15-fold. Except for Italy and Trinidad, there were no shipments made in February and March 1966. (Suisancho Nippo, May 2, 1966 and other sources.)

Japanese Frozen Tuna Exports to European, Asian, and African Countries, April 1965-March 1966

Country	Total	Albacore 1/	Yellowfin 2/	Big-eyed 3/	Bluefin 4/	Skipjack 5/
	Metric Tons (Value in US$1,000*)					
Italy 6/	32,148.4 (13,060.0)	1,798.8 (788.0)	21,217.8 (9,114.3)	5,612.2 (1,999.5)	3,139.6 (1,064.5)	380.0 (91.9)
Spain	6,373.1 (2,159.8)	4,474.9 (1,724.4)	132.5 (45.3)	498.7 (133.1)	54.8 (18.9)	1,212.2 (238.1)
Yugoslavia	2,988.2 (1,142.6)	1,463.0 (563.1)	779.2 (327.9)	283.0 (90.7)	462.0 (160.9)	-
Czechoslovakia	2,495.6 (682.4)	-	-	2,495.6 (682.4)	-	-
Ghana	520.2 (66.1)	-	162.7 (21.8)	145.0 (18.5)	-	212.5 (25.8)
Libya	436.1 (146.6)	93.0 (35.3)	30.0 (12.9)	303.1 (98.5)	-	-
Tunisia	318.8 (106.7)	147.6 (56.1)	10.3 (4.4)	155.8 (44.4)	5.1 (1.8)	-
Trinidad	308.1 (85.5)	-	-	295.9 (81.6)	12.2 (4.0)	-
France	237.0 (92.1)	237.0 (92.1)	-	-	-	-
Denmark	150.0 (35.3)	-	-	150.0 (35.3)	-	-
Sweden	35.0 (21.9)	-	-	-	35.0 (21.9)	-
Australia	7.2 (5.5)	-	7.2 (5.5)	-	-	-

1/Mainly round fish, but includes very small quantity of loins.
2/Includes round, gilled and gutted, dressed without tails (d.w.t.), fillets & loins.
3/Includes gilled and gutted, d.w.t., and fillets.
4/Round fish.
5/Includes data for February 1966.
6/Value figures in ().

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EXPORTS OF FROZEN TUNA TO U.S. AND PUERTO RICO, JANUARY-FEBRUARY 1966:

Japan's exports of frozen tuna to the United States and Puerto Rico increased in February 1966 as compared with the previous month. Exports to the United States dropped slightly in quantity but increased somewhat in value because of higher prices for frozen tuna. Exports to Puerto Rico increased considerably in both quantity and value. (Fisheries Attache, United States Embassy, Tokyo, April 19, 1966.)

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, February and January 1966

Species	February Qty.	February Value	January Qty.	January Value
	Short Tons	US$ 1,000	Short Tons	US$ 1,000
Albacore:				
United States	1,668	769	2,105	815
Puerto Rico	2,484	1,099	1,416	528
Total	4,152	1,868	3,521	1,343
Yellowfin:				
United States	2,179	990	2,535	993
Puerto Rico	1,295	498	308	93
Total	3,474	1,488	2,843	1,086
Big-eyed:				
United States	109	38	60	20
Puerto Rico	35	11	92	24
Total	144	49	152	44
Skipjack:				
United States	670	216	117	33
Puerto Rico	745	149	806	132
Total	1,415	365	923	165
Total United States	4,626	2,013	4,817	1,861
Total Puerto Rico	4,559	1,757	2,622	777
Grand Total	9,185	3,770	7,439	2,638

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EXPORT PRICES OF FROZEN TUNA, APRIL 1965-MARCH 1966:

The data in the following tables show monthly average frozen tuna export prices as compiled by the Japan Frozen Foods Exporters

Table 1 - Average Monthly Prices F.O.B. Japan, of Frozen Tuna Exported to the United States, April 1965-March 1966

	Albacore Round	Albacore Loin	Yellowfin G & G	Yellowfin Loin	Skipjack Round	Big-eyed
	(US$/Short Ton)					
1965:						
Apr.	318	690	311	684	-	1/420
May	313	688	312	684	227	1/580
June	290	687	312	-	227	-
July	292	670	314	675	-	2/252
Aug.	309	674	309	667	-	-
Sept.	322	693	320	710	242	1/420
Oct.	325	708	320	677	-	-
Nov.	325	733	312	711	-	1/500
Dec.	376	752	360	722	262	-
1966:						
Jan	388	812	390	809	291	2/339
Feb.	442	850	433	923	330	2/346
Mar.	472	931	486	977	344	2/364

1/Fillets.
2/Round.

Japan (Contd.):

Table 2 - Average Monthly Export Prices of Japanese-Caught Atlantic Tuna, April 1965-March 1966

	Exports to			
	United States 1/		Italy 2/	
	Albacore Round	Yellowfin G&G	Albacore Round	Yellowfin Dressed
	(US$/Short Ton)		(US$/Metric Ton)	
1965:				
Apr.	291	315	372	427
May	284	318	374	413
June	301	315	370	409
July	300	315	382	404
Aug.	300	317	374	415
Sept.	302	322	397	420
Oct.	303	321	380	424
Nov.	323	350	433	450
Dec.	363	320	438	474
1966:				
Jan.	379	372	471	493
Feb.	445	451	532	548
Mar.	494	476	591	589

1/f.o.b. or f.a.s. port of transshipment.
2/C.i.f. Italy.

Association and the Japan Export Frozen Tuna Producers Association. (Katsuo-Maguro Tsushin, April 25, 1966.)

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EXPORT TRENDS OF CANNED TUNA:

Japanese canned tuna in oil approved for export in business year 1965 (April 1965-March 1966) totaled 1,885,214 cases, according to data compiled by the Japan Tuna Packers Association. This was a decrease of about 100,000 cases from 1964 exports of 1,989,004 cases.

Japanese Canned Tuna in Oil Exports, BY 1965 and 1964

Principal Countries of Destination	BY 1965	BY 1964
	(No. of Actual Cases)	
West Germany	771,110	765,564
Canada	300,102	242,752
Switzerland	133,472	139,124
Aden	132,402	71,375
Netherlands	103,617	108,985
Great Britain	87,316	191,297
Belgium	78,918	92,461
Okinawa	66,232	75,267
Lebanon	63,299	43,198
Kuwait	36,319	25,248
Saudi Arabia	24,909	43,573
Other	87,518	190,160
Total	1,885,214	1,989,004

Japanese canned tuna other than in oil (specialty packs but not including in-brine pack) approved for export totaled 999,753 cases, 321,000 cases more than the 678,224 cases exported in 1964.

Principal countries of destination for the specialty packs of canned tuna were (1964 exports in parentheses): West Germany--801,569 (480,642); Netherlands--85,217 (79,781); Belgium--47,415 (45,257); Panama--10,985 (11,512); Great Britain--10,250 (5,175); Australia--6,750 (2,645); United States--3,606 actual cases (3,122). (Suisan Tsushin, April 19, 1966.)

Other Canned Tuna Exports	BY 1965	BY 1964
	(No. of Actual Cases)	
Vegetable tuna	858,838	575,583
Jelly tuna	74,147	72,064
Cream tuna	36,860	-
Tuna flake in soy sauce	8,520	20,080
Tuna spread	11,206	6,677
Chili sauce tuna	1,817	397
Tenderized tuna	700	2,700
Tomato tuna	45	193
Other	7,620	530
Total	999,753	678,224

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PACKERS ASSOCIATION SETS QUOTA ON CANNED TUNA CONSIGNMENTS TO SALES COMPANY:

The Japan Tuna Packers Association, at a meeting held on April 18, agreed on canned tuna consignments to the Sales Company in the ratio of 60-80 percent whitemeat tuna and 20-40 percent lightmeat tuna for the business year 1966 (April 1966-March 1967). (Suisan Tsushin, April 19, 1966.) Of those ratios, consignments by can size were set as follows:

Can and Case Size	Whitemeat	Lightmeat
	(Percent)	
7-oz. 48's	33	35
13-oz. 24's	22	20
4-lb. 6's	45	45

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CANNED FISH PRODUCTION AND MARKETING TRENDS:

The Japan Canners Association compiled a report on canned food production and marketing trends in 1965 and early 1966. The section dealing with fishery products states:

Canned Tuna: Production totaled about 6 million cases, declining despite the fact that United States demand increased and prices continued to increase since the fall, with export prices also going up. The National Federation of Tuna Fishermen's Associations (NIKKATSUREN) had not yet undertaken the promotion of canned albacore in oil as a result of high fish prices. (Note: In September 1965 NIKKATSUREN decided to launch a sales campaign to promote domestic consumption of albacore in oil. The program was to continue for three years, beginning November 1965, and was to be financed by assessment on albacore landed in Japanese ports.) The major fishing companies were reported planning to launch a campaign after March to sell

Japan (Contd.):

Fig. 1 - Slicing cooked and cleaned tuna loins for canning in a Japanese cannery.

solid albacore tuna in oil for 120 yen (US$0.33) a can at retail.

Canned Salmon: Production in 1965 increased greatly, totaling about 3.7 million cases. Due to a world shortage of canned pink salmon and a firm export market, supplies available for release on the domestic market are short. The major fishing companies completely sold their pack of factory-ship-produced pink by February 1966. Even the retail price of the flat No. 2 (7.8-oz.) pack increased to 98 yen ($0.27) a can.

Canned Crab: Production in 1965 totaled only about 850,000 cases and this has created an acute shortage on the domestic market. The demand is strong for fresh "zuwai" (tanner) crab from the Sanin District (prefectures on the southwestern part of the main Japanese island facing the Japan Sea), the fishery for which peaks in February-March, and the fresh product was selling at the high price of over 100 yen a kilogram ($0.13 a lb.). The No. 3 pack (drained weight 3.3 oz.) was wholesaling for 95-97 yen ($0.26-0.27) and retailing for 130-140 yen ($0.36-0.39) a can.

Fig. 2 - Processing crab meat for canning aboard a Japanese factoryship in the Bering Sea.

Canned Mackerel: Production increased greatly, totaling about 5.5 million cases. The winter mackerel fishery off Choshi, Chiba Prefecture, did not come up to expectations, but beginning around February 20, 1966, fishing began in the Yaizu, Shizuoka District. Natural flat No. 1 (15.5-oz.) wholesaled for 54-56 yen ($0.15-0.16) and natural flat No. 2 (7.25-oz.) wholesaled for 33 yen ($0.09) and retailed for 40 yen ($0.11) a can.

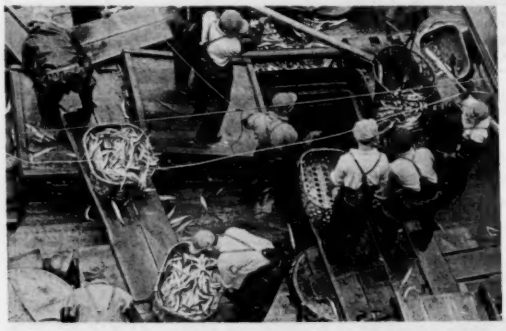

Fig. 3 - Washing and packing mackerel in baskets prior to putting the fish in the hold aboard a Japanese fishing vessel.

Canned Saury: Production in 1965 totaled about 2.35 million cases, of which 1.4-1.5 million cases of seasoned saury and 0.7 million cases of broiled saury were packed for the domestic market. The No. 6 (7.4-oz.) seasoned pack wholesaled for 38 yen ($0.11) a can and the oblong No. 5A (4.4-oz.) broiled pack wholesaled for 33-37 yen ($0.09-0.10) a can. (Suisan Tsushin, March 28, 1966.)

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EXPORTS OF MARINE PRODUCTS, DECEMBER 1965:

Japan's exports of marine products in December 1965 consisted principally of fresh and frozen fish valued at over US$5.5 million (over $4 million in November 1965) and canned products valued at over $19 million ($10.7

Japan (Contd.):

Japan's Exports of Marine Products, December 1965

Product	Quantity	Value
	Metric Tons	US$ 1,000
Fresh & Frozen Fish:		
Tuna, skipjack	1,372	222
Tuna, other	9,340	3,339
Marlin	821	711
Sea bream	1,191	208
Mackerel	164	30
Saury	272	67
Salmon	10	14
Other fish	1,954	914
Total fresh and frozen	15,124	5,505
Cured:		
Cod	7	5
Boiled and dried	71	25
Shark fins	122	192
Other	39	36
Total cured	239	258
Shellfish, etc., fresh, frozen, dried:		
Scallops	2	16
Oysters	15	17
Shrimp	202	453
Squid	1,620	508
Octopus (fresh)	236	114
Whale meat	14	6
Bull frog	49	94
Other	7	25
Total shellfish, etc.	2,145	1,233
Canned:		
Salmon	6,610	10,678
Tuna, skipjack	1,025	844
Tuna, other	2,658	2,517
Mackerel	3,506	1,200
Saury	657	292
Sardine	89	36
Horse mackerel	1,507	497
Other fish	1,628	1,311
Crab	284	1,042
Shrimp	63	122
Squid	355	136
Other shellfish	536	553
Total canned	18,918	19,228
Other Products:		
Seaweed, kombu	136	61
Seaweed, laver 1/	147	14
Agar agar	33	131

1/In 1,000 sheets.

million in November 1965.) (Fisheries Attache, United States Embassy, Tokyo, April 19, 1966.)

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EXPORT TARGETS FOR CANNED MARINE PRODUCTS, FISCAL YEAR 1966:

The Canned Goods Committee of the Japanese Ministry of International Trade and Industry's Agricultural and Marine Products Export Council held a meeting on April 7, 1966, and developed export targets for marine products for the fiscal year 1966 (April 1966-March 1967). (Fisheries Attache, United States Embassy, Tokyo, May 13, 1966.)

Japanese Canned Marine Products Export Targets for FY 1966 with Comparisons

Product	Quantity		Value	
	Target FY 1966	Actual Exports FY 1965	Target FY 1966	Actual Exports FY 1965
	. . (1,000 Cases). .		. . (US$100,000). .	
Tuna	5,300	4,909	460	408
Salmon	1,150	1,659	407	575
Crab meat	440	420	113	107
Sardine	110	73	8	6
Saury	1,030	462	66	29
Mackerel	700	698	44	46
Other	3,380	2,838	212	188
Total	12,110	11,059	1,310	1,359

Compared with actual exports for FY 1965, some increase is expected in all items for FY 1966 with the exception of salmon. The export target for canned salmon is down by almost one-third from the actual exports in FY 1965.

Note: See Commercial Fisheries Review, July 1965 p. 71.

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FROZEN SWORDFISH EXPORT VALIDATIONS TO U. S. AND CANADA, APRIL 1965-FEBRUARY 1966:

Japan's export validations of frozen broadbill swordfish (fillets, chunks, and "other" forms) to the United States and Canada in February 1966 totaled 691 short tons valued at US$534,513. This compared with 436 tons valued at $288,496 in February 1965 and 403 tons valued at $307,561 in January 1966.

For the 11 months, April 1965-February 1966, export validations of frozen swordfish to the U. S. and Canada totaled 4,630 tons valued at $3,487,411. Fillets accounted for 66 percent of the total. This compared with 64 percent of the total for the previous 10 months (through January 1966) and for the previous 9 months as well (through December 1965). For the 11 months, April 1964-Feb. 1965, frozen swordfish export validations totaled 3,832 tons valued at $2,485,134. (Fisheries Attache, United States Embassy, Tokyo, April 19, 1966.)

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EXPORTS OF FROZEN RAINBOW TROUT, FEBRUARY 1966:

Japan's exports of frozen rainbow trout in February 1966 doubled in quantity and value compared with the exports in January 1966. Exports in January amounted to 106 short tons valued at US$81,670. (Fisheries Attache, United States Embassy, Tokyo, April 19, 1966.)

Japan (Contd.):

Japan's Exports of Frozen Rainbow Trout by Country of Destination, February 1966

Country of Destination	February 1966	
	Quantity	Value
	Short Tons	US$
United States	146	113,414
United Kingdom	30	20,144
Belgium	5	3,794
Canada	15	11,011
Australia	4	3,292
West Germany	25	7,636
Other	5	3,549
Total	230	162,840

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FIRM CONTRACTS FOR EXPORT OF CANNED MACKEREL TO THE UNITED STATES:

A Japanese trading firm has contracted for export to the United States of 25,000 cases (48 1-lb. cans) of natural pack jack mackerel. The suggested export price (f.o.b.) for that pack for this year (as recommended by the Canned Mackerel Sales Company at a meeting held March 10) is 1,850 yen (US$5.14) a case, minimum 1,750 yen ($4.86). (Nihon Suisan Shimbun, March 14, 1966.)

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INCREASES EXPORTS OF CANNED MACKEREL TO THE U. S.:

As of March 31, 1966, sales of canned jack mackerel for export to the United States totaled 86,150 cases (1-lb. talls), including 25,000 cases contracted for sale in February, according to data compiled by the Japan Canned Mackerel, Sardine and Saury Sales Company. The marked increase in Japanese canned mackerel exports to the United States was attributed to a decrease in mackerel production in that country and in South Africa (which normally exports large quantities of that product to the United States). South African mackerel production was reported down 50 percent. (Nihon Suisan Shimbun, April 4, 1966.)

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QUOTA SET FOR NORTH PACIFIC SALMON FLEET:

Japan and the Soviet Union, after six weeks of negotiations in Moscow, agreed on April 14 on a North Pacific salmon catch quota of 96,000 metric tons in 1966 for Japan. (Suisan Tsushin, April 30, 1966.)

The Japanese Fisheries Agency, in turn, developed the following distribution formula for the 96,000-ton quota:

	Catch Quota	Percentage of Total
	. .(Metric Tons). .	
Area A (north of 45° N. latitude):		
Mothership-type fishery (11 motherships, 369 catcher vessels)	38,981	40.6
Land-based gill-net fishery (332 vessels)	9,019	9.4
Subtotal Area A	48,000	50
Area B (south of 45° N. latitude):		
Land-based gill-net fishery (332 vessels)	28,390	29.6
Land-based long-line fishery (369 vessels)	12,610	13.1
Small gill-net vessel (under 7 tons) fishery (1,378 vessels)	4,000	4.2
Japan Sea gill-net fishery (296 vessels)	3,000	3.1
Subtotal Area B	48,000	50
Grand total	96,000	100

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SALMON EX-VESSEL PRICES, 1966:

The Japan Federation of Salmon Fishermen's Associations (NIKKEIREN) and the Northern Waters Mothership Council (representing mothership operators) reached agreement May 7 on 1966 salmon ex-vessel prices.

Species	Ex-Vessel Prices			
	1966		1965	1964
	Yen/Kg.	Cents/Lb.	Cents/Lb.	Cents/Lb.
Red	248	31.3	30.7	27.4
Chum	142	17.9	16.6	14.9
Pink	114	14.4	13.4	11.9
King & silver	155	19.6	18.1	16.2

The agreement on prices to be paid fishermen calls for a 2-percent increase for red salmon and about a 7.5-percent increase for pink, chum, king, and silver salmon. (Suisancho Nippo, May 10, 1966.)

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KING CRAB FISHING TRENDS:

The two Japanese king crab fleets (Tainichi Maru and Keiko Maru) in Bristol Bay were reported as of April 30, 1966, to have caught 564,840 crabs and packed 24,339 cases (48-½ lb. cans) of crab meat. Their catch per unit of gear was 9.2-10.9 crabs and recovery rate 21.6-27.1 crabs a case. So far, fishing this season had been only fair. In part, according to the Director of fishing operations on the Tainichi Maru, this was attributed to the pres-

Japan (Contd.):

ence of pack-ice which carried away the nets, at times. Most of the nets were later recovered. (Suisan Tsushin, May 6, 1966 and other sources.)

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VIEWS ON NORTH PACIFIC FISHERIES PROBLEMS:

With the settlement of the tenth round of Japan-Soviet fisheries under unfavorable terms for the Japanese side, Japanese northern Pacific fisheries have entered a period in which the problem of organizational improvement must be taken up from a long-range point of view. The salmon catch quota has been curtailed to 96,000 metric tons as a result of the negotiations because the Japanese side, too, had to recognize the depletion of salmon and salmon-trout resources in the northern Pacific. Moreover, Japan is destined to encounter even greater difficulties in 1968, which is a lean year for both Japan-Soviet fisheries and American red salmon fisheries. Because of these circumstances, it has become necessary for the Government and fisheries circles to rebuild the present structure for fishing operations commensurate with the depletion of resources and, at the same time, ask for the release of the northeastern Pacific fishing grounds to the Japanese in the negotiations for revision of the Japan-U.S.-Canada Fisheries Treaty, to find an outlet from the aforementioned difficulties.

Salmon fisheries constitute the pillar of the Japanese northern Pacific fisheries based at Hokkaido and Tohoku. Their annual yield amounts to about 40 billion yen (US$110.5 million) in value, and one-half of that amount is exported. As has been revealed in the course of the recent Japan-Soviet fisheries negotiations, however, the salmon in the Northern Pacific are doubtlessly dwindling. It is necessary for Japan to continue resisting stubbornly the Soviet plan for the distribution of resources. It is also necessary, however, for Japan to establish, as early as possible, countermeasures to cope with the depletion of salmon in the northern Pacific.

The first problem, which must be taken up for the organizational improvement of northern Pacific fisheries, centered on salmon, is to curtail the scale of fishing operations commensurate with the depletion of resources. The reason is that in the negotiations with the Soviet Union, the Japanese side cannot avoid taking up the problem of curtailing the number of fishing vessels in the northern Pacific. It must be expected that the Soviet side will repeatedly ask Japan for such curtailment in future negotiations. As the Japanese delegation to the Japan-Soviet fisheries negotiations asserted, however, it is time for Japan to "make its own decision" on such curtailment.

The key problem is how to reduce the number of salmon fishing vessels on a rational basis. It is difficult for the Government to pay compensation out of the National Treasury to those who will suffer losses from such reduction. In the end it will become necessary to make use of the system of simultaneous renewal of the date and period of fishing licenses, which has first been adopted by the present Fisheries Law (to go into effect in August, 1967), as an important means of reorganizing northern Pacific fisheries.

The Fisheries Agency is studying measures for such renewal, with the view to expanding the scale and improving the organization of fisheries enterprises engaged in bonito, tuna, and mackerel fisheries and eastern drag-net fisheries (the scale of operations has already been fixed by the Japan-Soviet fisheries treaty for those engaged in salmon and crab fisheries). As for northern Pacific fisheries, there is the growing opinion that the Government should take drastic steps now for the amalgamation of small fisheries enterprises in order to lay the "foundations" for the curtailment of the number of salmon fishing vessels.

Another important problem which must be solved for the stabilization of northern Pacific fisheries centered on salmon is the revision of the Japan-U.S.-Canada Fisheries Treaty. It has been the cherished desire of the Japanese concerned with northern Pacific fisheries to revise this "unequal treaty" which bans Japanese fishing for American salmon across the "voluntary restraint line" (abstention line) established in the center of the Pacific (175° W. longitude).

While the Japan-Svoiet fisheries treaty permits offshore salmon fisheries, the Japan-U.S.-Canada Fisheries Treaty reflects the viewpoint that "the salmon which are bred in American or Canadian rivers, always belong to those two countries, regardless of wherever they move." Needless to say, such

Japan (Contd.):

a view contravenes freedom of the high seas. Japan holds that the Japan-U.S.-Canada fisheries treaty, which is based on such exclusivism, is a "bad law" rare throughout the world. Also the officials of the Fisheries Research Institute of the Agriculture-Forestry Ministry emphasize that "the American salmon resources still leave considerable room for further exploitation, in view of the scale of American and Canadian coastal fisheries."

All Japanese circles concerned hold unanimously that the only outlet from the present deadlock of northern Pacific fisheries, especially salmon, is the revision of the Japan-U.S.-Canada fisheries treaty in favor of the release of the northeastern Pacific fishing grounds as a new "frontier" for salmon fisheries. It is not permissible, of course, for Japan to catch at random the salmon from Bristol Bay where the United States and Canada have been attempting conservation of resources over a long period. If reasonable and appropriate catches, however, are permitted to Japan, the blow to be dealt the Japanese by the decrease in Asian salmon catches due to the Japan-Soviet fisheries treaty will be minimized. (Nihon Keizai, April 15, 1966.)

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FISH MEAL PRODUCTION FROM SOVIET-CAUGHT ALASKA POLLOCK:

The 14,000-ton Japanese fish meal factoryship Hoyo Maru returned to Yokohama March 29, 1966. The factoryship operated in the Okhotsk Sea, beginning in mid-January, buying Alaska pollock from Soviet trawlers for processing into fish meal and oil. She purchased 47,500 metric tons of Alaska pollock and produced 7,752 metric tons of meal, 495 tons of oil, and 1,120 tons of fish solubles. (Suisancho Nippo, March 30, 1966.)

Note: See Commercial Fisheries Review, March 1966 p. 58.

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NORTH PACIFIC WHALING REGULATIONS FOR 1966 ISSUED:

The Japanese Fisheries Agency on April 28 announced these whaling regulations for the Fifteenth (1966) North Pacific Whaling Expedition:

1. Number of whaling fleets to be authorized: 3 (to be operated by the same firms which participated in the 1965 operations).

2. Catch limit:

a. Whalebone whales--1,001 blue-whale units (same as actual production in 1965). For fin whales, the season's limit will be 1,265 whales. This represents a voluntary reduction of 10 percent from the 1965 production of 1,406 whales. Action taken in view of need to protect species. Ban on the harvesting of blue whales and humpback whales will continue as before. No catch restriction will be imposed on catch of sei whales since stock assessment indicates no need to regulate harvest of that species.

b. Sperm whales--3,000 whales. This represents an increase of 540 whales over the 1965 catch of 2,460 whales. The decision to increase the limit was based on the fact that the Soviets in 1965 harvested about 8,100 sperm whales, indicating that the stock is not in a poor condition.

3. Assignment of catcher vessels: In 1965 one fleet (which was granted an increase in catch quota of 200 blue-whale units) was licensed to operate with 11 catcher vessels, while the other two fleets were each restricted to 7 catcher vessels. There will be no restrictions placed on those two fleets this year.

4. Allocation of whale quota: The catch quota for whalebone whales will be allocated to the 3 whaling fleets:

Whaling Fleet	Catch Quota (Blue-Whale Units)
Kyokuyo Maru	467
Nisshin Maru No. 3	267
Nichiei Maru	267

The Kyokuyo Maru fleet receives the additional quota of 200 whales as in 1965.

The fin whale quota will be divided equally among the 3 firms operating the 3 fleets at the rate of 421 whales per fleet. The sperm whale quota will be allocated on the basis of 1,000 whales per fleet.

Fig. 1 - Japanese whale factoryship in Bering Sea. Note stern ramp for taking whale aboard.

Japan (Contd.):

Fig. 2 - Sperm whale meat ready for freezing aboard a Japanese factoryship in Bering Sea.

The Agency also announced its intention to progressively reduce the fin whale catch during the next three years. Two (Nichiei Maru and Kyokuyo Maru) of the Japanese whaling fleets were scheduled to depart Japan around May 15 and the third (Nisshin Maru No. 3) around May 20.

1966 Production Plan With Comparisons

Products	Nichiei Maru	Kyokuyo Maru	Nisshin Maru No. 3	Total	1965 Production
	(Metric Tons)				
Finback:					
Oil	3,658	11,010	-	14,668	14,545
Frozen meat	8,277	24,222	-	32,499	31,846
Sperm Whale:					
Oil	7,500	-	15,200	22,700	19,524
Frozen meat	2,000	-	3,950	5,950	-
Other	1,019	1,101	2,920	5,039	5,009
Total	22,454	36,333	22,070	80,856	70,924

This year finback meat, which was not fully used previously, is to be used completely. One company has concluded a contract with a U. S. pet food manufacturer for 3,000 metric tons of such food (the export price is about 80,000 yen a short ton (about US$221) c.i.f. (Suisan Tsushin, April 30, 1966, Nihon Keizai, May 15, 1966, and other sources.)

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FINBACK WHALE CATCH IN NORTH PACIFIC CUT BY TEN PERCENT:

Japan will "voluntarily" reduce her catch of finback whales in the Northern Pacific this year by 10 percent, the Fisheries Agency announced in late April 1966.

The decision was made in view of little hope existing for the four whaling countries (Japan, the Soviet Union, the United States, and Canada) to agree on how to conserve dwindling finback resources in the area. No agreement was in sight in time for the start of the whaling season in mid-May.

By this decision, Japan will reduce her catch for 1966 from the quota of 1,406 finbacks for last year to 1,266.

As diminishing whale resources in the Northern Pacific became apparent, the four countries concerned met in Honolulu in February. The international gathering failed to reach any agreement on restrictive measures to be taken. Japan also sounded out the Soviet Union in vain when the two countries met in Moscow on their salmon and crab quotas in Northwestern Pacific waters. Under the circumstances, Japan decided to self-impose the 10-percent restriction in conformity with a recommendation by a scientists' group at the Honolulu meeting, which proposed that Japan and the Soviet Union limit their total catch below 1,600 finbacks annually if whale resources are to be maintained at the present level.

By informing the other three parties of the new decision, the Fisheries Agency hopes that the Soviet Union also will voluntarily restrict its catch. The Agency thinks, however, that a final conclusion on this problem will be reached only after a series of whaling meetings this year, including a meeting of the International Whaling Commission in London in June (Mainichi, April 30, 1966).

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AGRICULTURE MINISTER URGES FISHING INDUSTRY TO PRACTICE RESOURCE CONSERVATION:

In an interview with the press, Japanese Minister of Agriculture Sakata was quoted as follows: " In the Japan-Soviet fishery talks this time, there were many difficult problems, but it was a matter for congratulations that the agreement came to a conclusion in a comparatively short period of time due to the spirit of friendship and mutual understanding between Japan and the Soviet Union which has been fostered for ten years after conclusion of the Treaty. I think highly of the efforts made by the members of the delegation, including Delegate Fujita, and at the same time, I wish to request again of our country's persons concerned with fisheries to realize conservation of resources under

Japan (Contd.):

orderly fishing operations so that this Treaty will be enforced smoothly." (Sankaii, April 15, 1966.)

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FISHING VESSEL CONSTRUCTION TRENDS, 1965/66:

Fishing vessel construction data compiled by the Japanese Fisheries Agency show that in Fiscal Year 1966 (April 1965-March 1966) a total of 807 steel vessels were approved by the Agency. This represents an increase in number of 33 vessels over FY 1965 but a decrease in total vessel tonnage of 2,592 gross tons. The FY 1966 construction trends were characterized by a marked increase in vessel building activity in the distant-water trawl fishery and a decline in the tuna long-line fishery. Particularly noteworthy was the drastic decrease in the construction of tuna long-liners of over 200 gross tons in size (reflecting the depressed condition of that fishery) and an increase in the construction of skipjack pole-and-line vessels in the 100- to 250-ton class. In the distant-water trawl fishery, a total of 38 vessels aggregating 35,227 gross tons was built, compared with 21 vessels totaling 16,659 gross tons in FY 1965. In the tuna long-line and skipjack pole-and-line fisheries, a total of 60 vessels aggregating 11,765 gross tons was approved for construction, compared with 129 vessels, totaling 27,463 gross tons, for FY 1965. By size class of vessel, they were as follows (1965 figures in parentheses): Under 100 tons--6 vessels (21); 100-200 tons--41 vessels (54); 200-300 tons--10 vessels (37); over 300 tons--3 vessels (17). (Shin Suisan Shimbun Sokuho, April 19, 1966.)

Republic of Korea

PURCHASE OF TUNA VESSELS FROM WEST GERMANY:

South Korean interests have commissioned a West German shipyard in Leer to build five tuna long-line vessels. The five vessels are expected to be delivered in 1966. (Allgemeine Fischwirtschafts-Zeitung.)

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FISHING FLEET EXPANSION PLANNED:

According to the Government of the Republic of Korea (ROK), the country's fishing fleet totals 48,716 vessels. These include 6,463 (13.2 percent) motorized and 42,253 (86.8 percent) non-motorized vessels, but about 17,000 are vessels over 10 years old. With assistance from Japan, the ROK plans to modernize her fishing fleet by motorizing the non-powered fleet and by replacing the older vessels with new and larger motorized vessels.

The ROK's distant-water tuna fleet totals 45 long-line vessels and, as of March 1966, 40 were reported fishing out of American Samoa. Under the proposed fishing vessel expansion plan, the distant-water tuna fleet is to be increased by over 200 vessels in the next 10 years. (Note: Other foreign vessels based at Samoa in March included 26 Japanese and 36 Formosan vessels.) (Suisancho Nippo, May 7 & 9, 1966.)

Malaysia

FISHERY TRENDS:

On July 1, 1965, the administration of fresh-water fisheries was reorganized. The federal fry production stations and training of farmers and would-be fish culturists in fish culture practices is now under the Fisheries Officer (Extension). During the third quarter of 1965, 232 new fish ponds covering some 40 hectares (excluding the unknown acreage of the 18 ponds opened up in Pahang) were put into operation. A total of 305,914 fish fry were distributed free to pond owners and a further 249,700 fish fry were released into various waters for public fishing.

Mechanization of fishing boats continued to progress with 388 inboard engines and 175 outboard engines installed during the third quarter of 1965. The marked preference for outboard engines over inboard engines in Johore Province continues.

The second 5-month marine fisheries training course for 1965 commenced in Penang on July 1, 1965. The enrollment at the end of September totaled 25, of which 7 were from the Borneo States.

In Kuala Trengganu, the third 3-month marine fisheries course for the year began

Malaysia (Contd.):

on September 4 with an enrollment of 25, including 7 trainees from Sarawak.

The Fisheries Division's 4-day training courses in fish culture practices attracted a total of 36 trainees.

Mexico

SHRIMP FISHERY, 1965 AND EARLY 1966:

The Mexican west coast shrimp fishery, while continuing to produce at a low level, finally exceeded last year's substandard output toward the end of the first quarter of 1966. Exports to the United States for the season from September 1, 1965, through March 18, 1966, were 30,883,000 pounds, up 189,000 pounds. Prices were up substantially to record levels.

Although no data were available, indications were that Gulf of Mexico production in the first quarter was running a little ahead of last year, which was a good season. At least 18 new shrimp vessels are under construction at Carmen and Campeche, reflecting a slight note of optimism.

Preliminary data on fishery production in the State of Baja California, the largest volume area in Mexico, indicate that 1965 catches were almost exactly the same as in 1964, about 58,500 metric tons. This is somewhat disappointing, as Baja California was expected to show a good increase and lead the Mexican fisheries out of the doldrums. (U. S. Embassy, Mexico, D. F., May 14, 1966.)

Morocco

STUDY TO REVIVE FISHING INDUSTRY IN AL HOCEIMA:

A delegation consisting of representatives from the ministries of Industry and Mines, the Interior, and the Merchant Marine arrived in Al Hoceima in mid-May 1966 to study the resources and the means available for developing the fishing industry in this area of the Mediterranean coast. The ministerial group will study several plans which have been drawn up by a group of businessmen in Al Hoceima. The study is being undertaken as part of a national effort aimed at bolstering the fishing industry in Morocco. (United States Consulate, Tangier, May 13, 1966.)

Note: See Commercial Fisheries Review, June 1966 p. 78.

Norway

HERRING AND COD FISHERY TRENDS, APRIL 23, 1966:

Herring: As of April 23, 1966, the 1966 Norwegian herring catch amounted to 5.1 million hectoliters (474,000 metric tons) and the capelin catch amounted to about 3.26 million hectoliters (303,000 tons). Fish meal and oil plants absorbed all of the 1966 capelin catch and 79 percent of the herring catch.

The bulk of the 1966 herring catch was taken in the winter herring fishery which ended in late March. The 1966 winter herring catch was double that in the previous year and the capelin catch was also up sharply.

Cod: The Norwegian catch of spawning and Finmark cod as of April 23, 1966, totaled 68,741 tons of which 20,056 tons went for filleting, 20,578 tons for drying, 21,680 tons for salting, and 6,427 tons for fresh consumption. The 1966 cod fishery off northern Norway has been somewhat more productive than in the past 2 years when catches were very light. As of April 24, 1965, the catch of 55,064 tons was used, 16,613 tons for filleting, 18,378 tons for drying, 11,970 tons for salting, and 8,103 tons for fresh consumption. (Fiskets Gang, April 28, 1966.)

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FISHERIES OCEANOGRAPHIC PROGRAM REVIEWED:

The Oceanographic Institute of the Norwegian Fisheries Directorate carries out research to assist Norwegian fisheries. The objective of the Institute is to study the basis of Norwegian fisheries, and to publish research results and distribute data that may aid the fisheries. On March 4, 1966, the Norwegian Government appointed a review committee for this oceanographic program to evaluate its effectiveness and whether or not changes are needed. (U. S. Embassy, Stockholm, May 3, 1966.)

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Norway (Contd.):

EXPORTS OF CANNED FISHERY PRODUCTS, 1964-1965:

Norwegian total exports of canned fishery products in 1965 were down about 3 percent in quantity and 2 percent in value from 1964.

Table 1 - Norwegian Exports of Canned Fishery Products by Type, 1964-1965

Product	January-December 1965			January-December 1964		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Kroner	US$1,000	Metric Tons	1,000 Kroner	US$1,000
Smoked brisling in oil	5,429	38,250	5,342	5,768	38,562	5,386
Smoked brisling in tomato	925	5,037	703	1,278	6,978	975
Smoked small sild in oil	11,244	48,832	6,820	11,077	48,743	6,528
Smoked small sild in tomato	1,809	6,528	912	2,154	7,644	1,068
Unsmoked small sild in oil	797	2,347	328	379	1,321	184
Small sild packed otherwise	902	3,429	479	673	2,489	348
Kippered herring	3,329	15,033	2,100	3,264	14,370	2,007
Mackerel	782	3,726	520	745	3,606	504
Roe, unclassified	1,020	4,324	604	1,330	5,613	784
Soft herring roe	817	5,339	746	1,141	5,593	781
Fish balls	608	1,716	240	531	1,374	192
Other canned fish	111	863	120	100	739	103
Shellfish	1,246	12,452	1,739	1,603	16,393	2,289
Total	29,019	147,876	20,653	30,043	151,425	21,149

Table 2 - Norwegian Exports of Canned Fishery Products1/ by Country of Destination, 1964-1965

Country of Destination	January-December 1965			January-December 1964		
	Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Kroner	US$1,000	Metric Tons	1,000 Kroner	US$1,000
Finland	313	1,656	231	269	1,424	198
Sweden	1,322	6,091	851	925	4,330	604
Belgium-Luxembourg	680	3,351	468	669	3,232	451
Ireland	215	815	114	298	1,209	168
France	248	1,069	149	278	1,121	156
Netherlands	236	1,064	148	202	875	122
United Kingdom	4,671	23,427	3,272	6,626	32,243	4,503
West Germany	1,112	4,465	624	899	3,483	486
Czechoslovakia	1,151	3,965	554	1,089	3,871	540
East Germany	1,563	5,337	745	1,276	4,322	603
South Africa Republic	1,436	5,747	803	1,740	6,950	970
Iraq	10	38	5	88	333	46
Canada	1,036	6,453	901	922	5,651	789
United States	11,247	62,957	8,793	10,479	56,021	7,824
Australia	2,046	8,723	1,218	2,144	8,858	1,237
New Zealand	419	1,908	266	466	2,004	279
Other countries	1,114	4,583	640	1,049	4,327	604
Total2/	28,819	141,649	19,782	29,419	140,254	19,588

1/Does not include exports of canned shellfish.
2/Totals are slightly different than the combined exports of canned fish (excluding shellfish) shown in table 1.
Note: Norwegian Kroner 7.16 equal US$1.00.

The United States was Norway's most important market for canned fishery products, accounting for 39 percent of total shipments in 1965 and 36 percent in 1964. (Norwegian Canners Export Journal, March 1966.)

Note: See Commercial Fisheries Review, Aug. 1965 p. 90.

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ANTARCTIC WHALE OIL PRODUCTION DROPS IN 1965/66:

The two Norwegian whaling expeditions participating in the 1965/66 Antarctic season produced 126,030 barrels of whale and sperm oil, or 54 percent of the 1964/65 production. The Norwegian expeditions captured only 66 percent of the blue-whale units allocated to Norway within the international whaling quota for the 1965/66 Antarctic season. (U.S. Embassy, Oslo, April 22, 1966.)

Peru

FISH MEAL AND ANCHOVY RESOURCE SITUATION, EARLY MAY 1966:

The following is a comparison of fish meal production of Peru on a monthly basis:

Month	1965/66	1964/65	1963/64
		(Metric Tons)	
October	41,463	130,492	76,769
November	116,716	181,673	166,167
December	213,742	180,979	139,629
January	242,380	194,104	195,551
February	179,330	122,285	125,216
March	194,309	191,930	175,170
April 1-15	83,190	92,924	83,134
Total	1,071,130	1,094,387	961,636

Peru (Contd.):

Based on these production figures, it appears that after a very poor start in October and November 1965, the anchovy landings for this season improved greatly, permitting fish meal production levels to exceed those of the same months (except possibly for April) of the two preceding seasons.

Fish meal stocks, as of March 31, 1966, stood at 445,347 metric tons and were estimated at about 530,000 tons in early May, as the fishing in the latter half of April was reportedly very good.

During the first week of May 1966, the price of fish meal rose about $20 a ton (to about $148.00 f.o.b. Peru).

At the end of March 1966, 147 fish meal plants were reported in production, compared with 142 for that period of 1965.

The current fishing season for anchovy was scheduled to end on May 31, 1966, with a total catch of about 7.8 million metric tons. Under present Peruvian regulations, there was to be a closed season June-August, with a maximum anchovy catch to be set for the 1966/67 fishing season, probably to be between 7 and 8 million tons. This new regulatory approach grew out of concern that the anchovy resource may have been overfished, which was expected to have serious immediate implications for the local reduction industry which has an estimated processing capacity of 16 million tons. As the industry is one which operates on heavy credit margins, and many of the plant and fishing fleet owners are heavily in debt, the closed season would likely impose a serious strain on financial resources of many in the industry. One anticipated result would be a consolidation, leading to fewer but more efficient fishing vessels and meal plants.

During the first quarter of 1966 (the second three months of the current fishing season), Peru exported fish meal to the following countries:

	Metric Tons	Percentage
Europe:		
West Germany	64,528	16.1
East Germany	29,615	7.4
Belgium	8,150	2.0
Czechoslovakia	8,896	2.2
Cyprus	50	-
Spain	47,990	12.0
Finland	3,000	0.8
France	5,794	1.4
Greece	2,782	0.7
Netherlands	45,286	11.3
Hungary	5,000	1.2
Great Britain	500	0.1
Ireland	1,000	0.3
Italy	26,263	6.6
Poland	17,071	4.3
Rumania	4,000	1.0
Sweden	4,448	1.1
Yugoslavia	13,905	3.5
Total	288,278	72.0
Western Hemisphere:		
Argentina	1,700	0.4
Brazil	100	-
Bolivia	12	-
Colombia	780	0.2
United States	60,454	15.1
Mexico	14,781	3.7
Venezuela	4,500	1.1
Total	82,327	20.5
Asia - Near East:		
Israel	2,000	0.5
Japan	28,000	7.0
Total	30,000	7.5
Grand Total	400,605	100.0

(Listing continued on next column.)

During January-March 1966, 16,312 metric tons of semirefined fish oil and 5,934 tons of crude fish oil were exported, a total of 22,246 tons.

It is interesting to note that vast resources of hake exist off Peru and Chile which can be converted to fish meal. Chile is already producing over 10,000 metric tons of fish meal annually from hake. Up until now, the fish reduction industry in Peru has been largely dependent upon the anchovy resource for its raw material, but the advent of conservation regulations may accelerate development and utilization of the hake resource potential. (U.S. Embassy, Lima, May 10 and May 24, 1966.)

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USAID MISSION FAVORS SMITHSONIAN PROPOSAL TO STUDY RELATIONSHIP BETWEEN ANCHOVY AND GUANO BIRD POPULATION:

Members of Peru's guano fertilizer industry believe that the recent decline in the number of guano birds is related to the competition for the anchovy resource from the fish meal industry. The members of the fish meal industry, however, do not believe that a relationship necessarily exists; there is the possibility that when the Humboldt current changes and the fish go deep under water, the fish are inaccessible to the birds and they die of starvation from natural causes. Bird numbers declined drastically in 1911, 1917, 1925, 1932, 1950, and 1957, prior to extensive develop-

Peru (Contd.):

ment of the fish meal industry in the 1960's. Some believe that about 9 million metric tons of anchovy could be harvested annually without serious competition to the guano bird population.

In 1965, the guano bird population declined to 3 million birds from 18 million in 1964. The production of guano fertilizer was 168,700 metric tons in 1965, a drop of 36,391 tons from 1964. Guano fertilizer is cheap because of a Government subsidy. In a reasonably free market, guano could not compete with commercial fertilizers. It is interesting to note also that during 1965 there was a steady expansion of the Peruvian production of chemical fertilizers (97,444 metric tons produced in 1965, compared to 81,086 tons in 1964) in line with the increasing demand of both domestic food producers and export crop growers.

In the meantime, the Smithsonian Institution has proposed to conduct a research study on all aspects of the problem and the USAID Mission in Peru has pledged full cooperation with Smithsonian scientists. (U. S. Embassy, Lima, May 6 and May 11, 1966.)

Portugal

TUNA FISHERY MODERNIZATION PLANS:

The Portuguese tuna industry is dependent on the catch of fish traps and small wooden vessels. But the Portuguese fisheries development plan for 1965-1967 calls for construction of four ocean-going tuna vessels as well as new cold-storage support bases.

It was reported in early May 1966 that Germany has agreed to (1) help Portugal transform a vessel into a modern live-bait tuna fishing vessel and (2) provide two technicians to make a 6-months tuna survey off the Cape Verde Islands. If the survey is promising, Portugal may build a fishing base in the Cape Verde Islands. Germany is the leading buyer of Portuguese canned fish. (U.S. Embassy, Lisbon, May 10, 1966, and other sources.)

South Africa

PLANS FACTORYSHIP FISHING OPERATION:

Following the failure in 1965 of offers for public subscriptions in the Willem Barendsz (a 26,000-ton former whaling factoryship), which is to be converted into a floating fish factory, the project has proceeded with private capitalization. Included is a 40-percent share held by an established inshore fishing group. The ship is undergoing conversion, a process which will require a total of several months for completion. In the meantime, negotiations are under way to bring Willem Barendsz Ltd. into the marketing orbit of South African Fish Meal Producers. Although various restrictions have been placed upon the operation of the factoryship (an embargo on the use of South-West African ports and operations within the 12-mile fishing limit), the ship will have access to Cape Town docks. (United States Embassy, Pretoria, April 29, 1966.)

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PELAGIC SHOAL FISH CATCH OFF TO SLOW START IN 1966:

The poor start for South Africa's 1966 shoal fishing season, with disappointing catches in January, was attributed to poor fishing south of Cape Town. The Cape west coast catch in January 1966 amounted to 21,287 metric tons as compared with 38,713 tons in 1965 and 68,041 tons in 1964. This was especially disappointing in view of the high and firm prices for fish meal quoted at US$182 a metric ton c.i.f. European ports.

South Africa's Pelagic Shoal Fish Catch, January 1966 with Comparisons for 1965 and 1964

Species	1966	1965	1964
		(Metric Tons)	
Pilchards	4,637	12,276	63,781
Maasbanker	6,359	6,746	3,666
Mackerel	3,338	4,362	594
Anchovy	6,953	15,329	-
Total	21,287	38,713	68,041

The January 1966 catch in South Africa yielded 4,832 short tons of fish meal, 169,583 imperial gallons of fish body oil; also 124,272 pounds of canned pilchards, 232,454 pounds of canned maasbanker, and 313,632 pounds canned mackerel, making a total of 670,368 pounds of canned fish.

While South African factories were unable to take full advantage of the firm price situation, fish meal production in Peru was reported good. The industry in South-West Africa was hoping for an increase in the pilchard

South Africa (Contd.):

catch quota for 1966. The 8 plants in South-West Africa were granted a quota of 90,000 tons each, or a total of 720,000 tons for 1966. The hoped-for increase was 10,000 tons for each plant which would bring the total to 900,000 tons. It was reported that the Peruvian fish meal industry would produce stickwater concentrate in 1966 to partially offset an expected drop in meal production because of a catch quota of 7,000,000 tons of anchoveta imposed by the Government of Peru.1/

Because of the poor catch for the first part of the season by the South African industry, the Walvis Bay pilchard industry of South-West Africa was concentrating on the manufacture of fish meal to meet the heavy commitments for this year. The entire fish oil production for the season has already been sold in advance at a good price to the United Kingdom.

The canning prospects in South-West Africa for this year also look bright. Traditional markets have placed firm orders while the local market in South and South-West Africa has shown a marked increase. It is estimated that the local market will take about 1,750,000 cases of canned fish this year as compared with barely 500,000 cases five years ago.

The average oil yield during the third week of February was about nine gallons per ton of fish at Walvis Bay. The fish were being caught fairly far out--from 9 to 10 hours steaming from the factories. (South African Shipping News and Fishing Industry Review, March 1966.)

1/See "Peru."

South Africa Republic

CONSERVATION MEASURES PROPOSED FOR TRAWLING OFF COAST:

Japanese fishing industry circles welcomed a recent proposal by a West German fishing company for holding an international conference to conclude an intergovernmental or private agreement to regulate trawling activities off South Africa. The proposal was made during a visit in Japan in May 1966, by the president of a large German fishing company who is also the president of the West German fishery association. It was reported that the proposal is unofficially supported by the Government of West Germany.

The conservation measure would apply to the taking of porgies or sea breams (Pterogymnus laniarus) and cape hake or stockfish (Merluccius sp.) and would provide for a cod-end mesh of 160 millimeters (about 6.3 inches) as compared with 90 millimeters (about 3.5 inches), the mesh size of trawls now used by Japanese vessels fishing in the area. It was said that at present the internationally accepted size of trawl cod ends is 110 millimeters (about 4.5 inches) as provided for in the regulations set up under the International Convention for the Northwest Atlantic Fisheries.

Japanese fishery circles believe the proposal is a timely one because it will forestall moves by African coastal nations to set up exclusive fishing zones beyond their coastal waters. Such a step was considered desirable also in view of increasing international competition for fish in the waters off the coast of South Africa. It was reported that trawlers from Great Britain, Japan, West Germany, South Africa, and the U.S.S.R. are already fishing in the area and that vessels from other nations now fishing farther north in the eastern Atlantic would eventually move to the area. (The Japan Economic Journal, May 24, 1966.)

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WHALING REGULATIONS FOR 1966 ISSUED:

On April 29, 1966, the Government of South Africa issued regulations setting the maximum number of whales which may be taken during the 1966 season by land stations located on the Indian Ocean and Atlantic Ocean coasts as follows:

Indian Ocean (Durban): baleen whales 236.8 blue-whale units; sperm whales 2,847 whales.

Atlantic Ocean (Saldanha Bay): baleen whales 162.7 blue-whale units; sperm whales 798 whales.

For the purposes of this regulation the blue-whale unit equivalents were set at: 1 blue whale unit is equal to 2 fin whales or 6 sei whales. On February 4, 1966, the Government issued a regulation setting the 1966 whaling season for land-based stations as follows:

Indian Ocean: baleen whales, April 1 through September 30; sperm whales, February 1 through September 30.

South Africa Republic (Contd.):

Atlantic Ocean: baleen whales, May 1 through October 31; sperm whales, March 1 through October 31. (United States Consul, Cape Town, May 20, 1966.)

South-West Africa

MAY RAISE PILCHARD CATCH QUOTAS:

Although the results of the work of the new South-West African commission of enquiry into the fishing industry are not yet known, expansion plans among fishing companies appear to indicate that the commission will approve a rise in pilchard catch quotas from their present level of 90,000 tons for each of the 8 factories. Suid Kuene Visserye's (Walvis Bay) annual report showed that the company ordered construction of 7 fiberglass and one wooden fishing vessel at a cost of US$1.2 million. The vessels will be built in Cape Town, South Africa. A fishing industry spokesman also indicated that a second Walvis Bay company is completing extensive modifications of its processing plant, almost certainly with an expansion of capacity. The spokesman noted that all South-West African plants already possess excess capacity and could easily step-up production with little, if any, expansion of plants. Most technical experts in South Africa seem to agree that South-West African quotas could rise at least to a total of 1,000,000 tons (presently 720,000 tons) with no harm to the supply of pilchards. Among the questions undoubtedly facing the commission of enquiry, however, is whether to allocate the increase to existing factories or to new companies.

In a speech before the South-West Africa Legislative Assembly, Administrator W. Duplessis pointed out the profits of the fishing industry in 1965. Increased world demand for fish meal and oil brought profits to a new peak. Fish meal production was valued at $27.7 million while the value of canned fish, principally anchovies, was $19.1 million. The steady increase in demand for fish oil prompted construction of storage tanks to hold 23,000 gallons at Walvis Bay. The market for spiny lobsters also increased, partly because of lower Australian production. The administrator called for more attention by domestic fishermen to the white fish industry which, thus far, has been exploited by foreign fishing fleets off the coast of South-West Africa; nevertheless, the white fish catch by fishermen was 1.6 million pounds in 1965, double that of the previous year.

Preliminary reports on the 1966 fishing season are even rosier. Fish meal prices are approximately 20 percent higher than in 1965 and the entire 1966 production of fish oil already has been sold at prices equal to those last year. A new development is the experimental canning of anchovies in soya sauce for the Japanese market. (United States Embassy, Pretoria, April 29, 1966.)

Turkey

SPONGE EXPORTS, 1965:

Turkish sponge exports in 1965 totaled 38 metric tons of which 34 tons went to Greece, with the remainder going to North America, Italy, Sweden, Japan, Canada, and Denmark. (Alieia, April 1966.)

U.S.S.R.

DISCOVERY OF NEW PACIFIC OCEAN PERCH STOCKS:

A Soviet exploratory vessel discovered large concentrations of Pacific Ocean perch in the central Bering Sea. A factory stern trawler was despatched to the new grounds to begin the perch fishery in mid-May 1966.

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INDIAN OCEAN TUNA FISHING:

The Soviet tuna factoryship Leninskii Luch returned to her home port of Vladivostok af-

Fig. 1 - Soviet tuna factoryship, sistership to Leninskii Luch, built in Japan in 1965.

U.S.S.R. (Contd.):

Fig. 2 - Conveyor used to carry tuna from deck to processing lines below deck aboard Soviet tuna factoryship. Fish are weighed; man measuring fish, and another recording data.. Conveyor rubber mat has lips to keep fish from sliding off belt.

Fig. 3 - Tuna processing line aboard Soviet factoryship.

Fig. 4 - Chute carries loins to canning line. Stainless chute is used to wash tuna loins.

Fig. 5 - Weight checker--cans weighing short are picked out of line by means of a "phototube." Men are timing flow of cans.

ter 9 months in the Indian Ocean. A total of about 1,500 metric tons of fish were caught, or one-third more than the quota established for the trip. Over 2 million cans of fish were packed.

Editor's note: This was the vessel's second fishing trip. On its first trip (in 1965) the Leninskii Luch was fishing also for sharks to be exported as frozen meat and fins to Japan.

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INDIAN OCEAN FISHING EXPANDED:

At least 2 fishing trawlers (both from the Black Sea Fisheries Administration) began fishing in the Mozambique Channel (between Africa and the Island of Madagascar) in May 1966.

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EXPANSION OF FAR EASTERN FISHERIES:

Soviet fishery planners foresee the largest expansion of Soviet fishery operations during the 1966-1970 Five-Year Plan in the Far East where several large fishing ports are being built or are being planned. The Vladivostok fishing port will be the largest in the Soviet Union exceeding that of Murmansk where presently over 800,000 metric tons of fish a year are landed. At nearby Nakhodka several new fishing wharfs have been built, as well as two large refrigerated storage plants. One, capable of storing 11,000 metric tons of fishery products, is the largest refrigerated fish storage in the Soviet Union. The Far East

U.S.S.R. (Contd.):

provides at present 33 percent of the total Soviet fishery catch. Ninety percent of that catch is harvested by processing vessels which deliver to shore bases fishery products in finished or semifinished form.

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KAMCHATKA FISHERMEN STRIVE TO FULFILL CATCH QUOTAS:

The catch goals for Kamchatka fishing vessels provided that during May 1966 each large stern factory trawler belonging to the Kamchatka Fisheries Administration catch 1,400 metric tons of fish. Since most Kamchatka factory stern trawlers fish for ocean perch and other rockfish, the monthly quota probably refers to those species.

Each Kamchatka medium trawler was to catch 260 metric tons, but Gulf of Alaska medium trawlers fishing for Pacific ocean perch and other rockfish were to catch 620 metric tons in May.

The vessels during January-April 1966 did not fulfill the planned landings of edible fish. As a result, their planned catches for May (55,900 tons) were set about 16 percent higher than originally scheduled (46,900 tons).

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FISHERY EXPORTS TO GREAT BRITAIN:

A British firm, which is the sole importer and distributor of Soviet fishery products for Great Britain, has concluded a US$3.5 million contract for the importation of Soviet canned salmon and canned crab meat during the first half of 1966.

Editor's note: The firm, a subsidiary of a larger food company, is a traditional importer of Soviet fishery products. In 1964, Soviet crab meat and salmon exports to the United Kingdom amounted to about $3.7 million.

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FISHERY EXPORTS TO GREECE:

Two new delicatessen fishery products--squid and mussels canned in natural juice--are being mass-produced in the Soviet Far East for Greek markets. By March 1966, over 500,000 cans of squid and 30,000 cans of mussels were shipped.

Editor's note: The Greek firm is an importer of frozen and canned fishery products (mostly sardines from Portugal and anchovies from Spain).

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CANNING OF SHARK MEAT IN MURMANSK:

The Fisheries Administration at Murmansk has begun canning shark meat in four varieties: in natural juice, smoked, fried, and "steaks" or slices. (The Evening Star, Washington, D.C., January 28, 1966.)

Editor's note: Increasing Soviet operations off U.S. mid-Atlantic coast might have produced incidental catches of sharks. In 1964, the Soviets reported a catch of only about 100 metric tons of sharks. However, in early 1966 the Soviets reported the start of a shark fishery in the Sea of Japan. It is possible that full-scale shark fishing in the Atlantic is also being planned since it is hard to conceive that the Soviets would invest in a canning operation without making some provisions for the steady flow of raw material.

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DEEP-WATER RESEARCH DEVICE:

A deep-water research device designed by Soviet experts resembles a single-stage rocket. It can submerge to a depth of 12,000 meters (39,360 feet) and register information about the physical processes taking place in the water all the way to the ocean floor. The automatic device incorporates electronic measuring assemblies, with supply sources and a self-balancing system. It is 4 meters (13 feet) long and works according to a preset program, automatically conducting an entire series of measurements and obeying the signals of its electronic programming block. Upon completion of its task, the device responds to a recall signal and slowly ascends to the surface where an antenna buoy emits a signal.

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WHALING OPERATIONS:

The Slava, one of the three Soviet whale factoryships that operate in the Antarctic out of European Russia, was transferred from its home port of Odessa on the Black Sea to Vladivostok in the Far East. The transfer occurred at the end of May 1966 after the Slava concluded its 1965/66 Antarctic whale expe-

U.S.S.R. (Contd.):

dition. It is not quite clear whether the Slava will operate in the Pacific as a whaler or as a fish-processing vessel. However, since she is scheduled to depart on her next Pacific expedition within a short time, it seems likely that she will be--at least this season--engaged in whaling. Conversion of the vessel for fish processing would probably take considerable time. The transfer of the Slava may also be one of the reasons why the Vladivostok and Dalnii Vostok are now being used as fish-processing vessels.

Soviet whale factoryship Vladivostok.

In 1965, the Soviet whale factoryships Dalnii Vostok and Vladivostok were used as fish-processing factoryships for the first time since their delivery in 1962 (from Kiel, West Germany, for a reported US$16 million for each vessel). Both vessels in 1965 processed 57,000 metric tons of Alaska pollock into 7,500 tons of fish meal and 5,000 tons of frozen pollock. In 1966, both will continue to process pollock. When the Soviets bought these two factoryships, they specified that they must be constructed in a manner permitting their use as both whaling and fish-processing floating factories. This may indicate that the U.S.S.R. was planning to diversify, if needed, its whaling operations as far back as 1962. It also means that the Soviets will probably de-emphasize Antarctic whaling for the 1966/67 season. The entire Soviet Far Eastern whaling industry presently employs about 4,300 persons.

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ANTARCTIC EXPERIMENTAL KRILL FISHERY:

The scientists of the Soviet Antarctic whaling flotilla Slava have studied the commercial use of large stocks of Southern Hemisphere krill (Euphausia superba) for several years. Prior to the 1958/59 whaling season, studies were made only on krill found in the stomachs of whiskered whales. The first experiments on commercial krill fishing with variable-depth trawls were conducted in 1959 by the scientific research ship Ivan Nosenko.

Kilometers-wide "fields" of krill, i.e., accumulations of large (up to 6 cm. long) Euphausiids (the source of food for various antarctic animals such as the whiskered whale, seals, fish, and birds) were found at the ocean surface during the Antarctic summer.

The Soviets believe that up to 5-10 metric tons of large krill, which can be used as feed for farm animals, may be caught in 30-60 minutes of sweeping in krill "spots" from diesel-electric whaling ships using industrial pelagic trawls. It is also possible that high-vitamin fat may be obtained from the krill. The equipment available on Soviet whaling ships can successfully be used to process the krill. (Soviet Antarctic Expedition Information Bulletin, Vol. II, pp. 124-125, issued by Elsevier Publ. Co., Amsterdam, N. Y., London, 1964.--Original paper published 1960, Inform. Byull. Sovetsk. Antarict. Eksped., 1955-1958, No. 14.)

United Kingdom

LANDING TRENDS, 1965:

Landings of fish (excluding shellfish) during 1965 in England, Wales, and Scotland totaled 1.96 billion pounds as compared with landings of about 1.8 billion pounds in 1964.

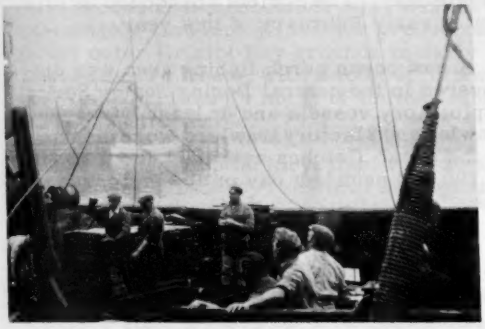
Table 1 - Landings of Principal Species in England and Whales, 1964-1965
(Does Not Include Scottish Landings)

Species	1965			1964		
	Quantity	Value		Quantity	Value	
	1,000 Pounds	£ 1,000	US$ 1,000	1,000 Pounds	£ 1,000	US$ 1,000
Cod	593,141	21,110	59,108	557,496	19,222	53,822
Haddock	136,675	5,397	15,112	135,882	5,385	15,078
Plaice	73,940	4,926	13,793	78,082	4,698	13,154
Saithe	81,898	1,364	3,819	72,235	1,183	3,312
Ocean perch	34,267	508	1,422	37,375	538	1,506
Herring	33,727	621	1,739	39,425	733	2,052
Sprat	21,764	120	336	31,948	139	389
Other fish	163,129	6,283	17,592	162,564	6,262	17,535
Total (excluding shellfish)	1,138,541	40,329	112,921	1,115,007	38,160	106,848

Source: British Ministry of Agriculture, Fisheries, and Food.

United Kingdom (Contd.):

In 1965, landings in England and Wales accounted for about 58 percent of the total, and Scotland accounted for the remainder. Cod dominated English landings while haddock was the leading item in Scottish landings. Increased deliveries of those species accounted for much of the gain in British landings during 1965. Scottish landings of sprat were also up sharply.



Stanchion which supports gangplanks is taken off a British deep-sea trawler, Grimbsy, England. Vessel has finished unloading a trip of fish.

Landings of Nine British Distant-Water Trawlers at Grimsby, England, During the Week Beginning March 28, 1966

Vessel	Quantity	Gross Value	
	Pounds	£ Sterling	US$
Vianova	341,460	12,082	33,830
Royal Lines	329,420	11,642	32,598
Northern Jewel	371,280	11,172	31,281
Lifeguard	314,580	11,046	30,929
Lord Willoughby	288,680	10,861	30,411
Northern Eagle	278,600	11,937	33,423
Northern Chief	308,000	12,844	35,963
Coldstreamer	392,000	14,718	41,210
Northern Gift	323,540	13,771	38,559

($28,000) and all but 2 of the vessels landed over 300,000 pounds.

* * * * *

PURSE-SEINE EXPERIMENTS MAY INCREASE HERRING CATCH AND FISH MEAL PRODUCTION:

British plans to test herring purse-seine fishing were discussed in the Fishing News, April 15, 1966. Separate tests were to be carried out with the middle-water trawler Princess Anne based at Lowestoft and the herring vessel Glenugie III based at Peterhead. The Glenugie III was to be equipped with a nylon purse-seine net 1,440 feet long and 420 feet deep costing about £10,000 (US$28,000).

Table 2 - Landings of Principal Species in Scotland, 1964-1965

Species	1965			1964		
	Quantity	Value		Quantity	Value	
	1,000 Pounds	£ 1,000	US$ 1,000	1,000 Pounds	£ 1,000	US$ 1,000
Cod	104,012	3,913	10,956	102,046	3,841	10,755
Haddock	234,878	5,451	15,263	194,743	4,833	13,532
Whiting	88,902	1,469	4,113	69,759	1,407	3,940
Herring	182,287	2,279	6,381	176,809	1,958	5,482
Sprat	103,992	369	1,033	47,127	128	358
Other fish	109,054	4,027	11,276	108,003	3,795	10,627
Total (excluding shellfish)	823,125	17,508	49,022	698,487	15,962	44,694

Source: Department of Agriculture and Fisheries for Scotland.

The 1965 United Kingdom landings of fish and shellfish combined yielded a record ex-vessel value of £60.8 million (US$170 million) as compared with £56.9 million ($159 million) in 1964.

* * * * *

DISTANT-WATER TRAWLER LANDINGS AND EARNINGS DATA:

Nine distant-water trawlers of one British firm landed at Grimsby during the pre-Easter week of March 28, 1966, and delivered over 2.9 million pounds of fish. Average landings and gross earnings for each of the vessels were 327,506 pounds and £12,230 (US$34,245). The best trip was 392,000 pounds with an ex-vessel value of £14,718 ($41,210). Each of the vessels had gross earnings of over £10,000

Success in these experiments and development of a modern purse-seine fishery could lead to a sharp increase in herring landings, which in turn could expand British production of industrial fishery products and thus reduce Britain's heavy dependence on imported fish meal and oil.

* * * * *

NEW METHOD OF TRANSFERRING FISH AT SEA TESTED:

In the spring of 1966, the British White Fish Authority's Industrial Development Unit carried out tests of a new method of transferring fish at sea from one vessel to another. Two 130-foot trawlers, the Ardenlea and the Summervale, took part in the tests which were held in the Pentland Firth with a wind of up to force

United Kingdom (Contd.):

5, but with slightly less severe sea state. The vessels were brought together with the help of a new fendering system. Then the fish were transferred in aluminum boxes by means of traditional union purchase rigs. Rate of transfer achieved was 10 metric tons an hour per hoist.

The advantage of this method of transfer is that the fish are not immersed in the sea. The White Fish Authority pointed out that larger vessels might be able to use this transfer system in even worse weather than that encountered during the test. (The Fishing News, London, May 6, 1966.)

* * * * *

FISHING EXHIBITION TO BE HELD IN LONDON IN 1967:

A British trade periodical plans to present a World Fishing Exhibition in London, June 1-7, 1967. The exhibition will be sponsored by a number of British Fishery Associations and will be open only to members of the fishing industry. Exhibitors from many countries will be invited to display fishing gear, vessel designs, marine engines, deck machinery, electronic navigating and fish-finding devices, and refrigerating and processing equipment.

A similar exhibition was held in London in 1965. For additional information about the 1967 exhibition write to Commercial Exhibitions Ltd., The Tower, 229-243 Shepherds Bush Road, Hammersmith, London, W. 6, England.

Note: See Commercial Fisheries Review, September 1965 p. 79.

Foreign Fishing Off United States Coasts, May 1966

Off Alaska: SOVIET: Trawling for Pacific ocean perch continued to be the largest Soviet fishery off Alaska. Throughout May a fleet of about 90 vessels fished for perch in the Central Gulf of Alaska from Yakutat to outer Portlock Bank east of Kodiak Island. A smaller number of trawlers fished off southeast Alaska (Cross Sound) in late May; by month's end about 35 vessels were fishing.

At least two factory trawlers resumed the ocean perch fishery in the western Aleutians in late May. The Soviets abandoned this fishery in early February of this year.

A new ocean perch fishing area was discovered in the central Bering Sea by Soviet exploratory vessels and at least 1 freezer trawler and 2 factory trawlers were dispatched to the area. Catches averaged about 80,000 to 100,000 pounds a day on the factory trawlers.

The Soviet shrimp fishing fleet, centered in the Shumagin Islands area, declined during May to about 5 medium freezer trawlers serviced intermittently by refrigerated fish transports. In April that fleet consisted of 12 medium freezer trawlers and 1 refrigerator vessel.

The flounder fleet in outer Bristol Bay, which was reported disbanding in late April, discontinued operations in mid-May. Participating vessels were transferred to the Gulf of Alaska and off the Pacific Northwest coast to fish for other fisheries.

The 3 king crab factoryships, accompanied by 12 tangle-net handling trawlers, operated throughout the month on the broad Continental Shelf north of the western Alaska Peninsula. These factoryships were first reported in April, although it became evident during boardings that they began operations in early March 1966, one month earlier than usual.

Soviets report that three whaling fleets were active in the North Pacific in early May. Each fleet consists of a factoryship and 9 accompanying whale killers.

JAPANESE: At the end of May about 111 Japanese fishing vessels were operating in waters off Alaska. In addition, 11 salmon motherships accompanied by 369 catcher vessels (the same number as in 1964 and 1965) were fishing for salmon in the North Pacific between 175° W. longitude and the far western Pacific. Most of the salmon fishing vessels were operating well west of the 175° W. "abstention line."

By the end of May, 8 Japanese factory trawlers had entered the Gulf of Alaska and were fishing from near Kodiak Island westward to the Unimak Pass region. Catches consisted mainly of ocean perch with Alaska pollock second in abundance. At least 4 additional factory trawlers operated along the eastern and central Aleutians during the month, taking mainly ocean perch and Alaska pollock.

A second fish-meal factoryship with 29 accompanying trawlers joined her predecessor on the outer Bristol Bay grounds in early May. The two fleets, with a total of 59 trawlers, fished primarily north of Unimak Island throughout the month.

The two shrimp factoryships, with 24 accompanying trawlers, remained throughout the month on the proven grounds north of the Pribilof Islands.

In late May one of the Japanese king crab factoryships and her five tangle-net setting trawlers shifted from north of Port Moller to just east of the Pribilof Islands. The Japanese began commercially exploiting stocks of blue king crab (Paralithodes platypus) near the Pribilofs last year. The second Japanese king crab fleet (1 factoryship and 5 trawlers) fished primarily north and west of Port Moller during May.

VIOLATIONS OF U.S. TERRITORIAL SEA:

The incidence of violations of U. S. territorial waters in Alaska by foreign fishing vessels increased sharply during the first few months of 1966. The number of reported violations through early May had exceeded the total of such violations reported in 1965. This year 17 incidents of unlawful entry by foreign vessels have been reported as compared with 13 such violations in 1965, 17 in 1964, and 18 in 1963.

In 1963 and 1964, the alleged offenders were about equally divided between the Japanese and Soviets. Beginning in 1965 a greater proportion of offenses were charged to Soviet vessels, and in 1966, of the 17 violations reported to date, 15 are attributed to Soviet vessels.

Actual fishing by foreign vessels within our territorial sea has also become more prevalent this year. In 1964, the year Senator Bartlett's bill prohibiting such fishing became Public Law 88-308, none of the Japanese or Soviet vessels detected in our waters was engaged in fishing. Last year in only 2 of the 13 incidents were the vessels fishing within the territorial sea. This year Soviet vessels have been fishing during 5 of 15 reported incursions into our waters.

BOARDING OF SOVIET KING CRAB FACTORYSHIPS:

In accordance with the provisions of the U.S.-U.S.S.R. agreement on king crab fishing, signed in early 1965, Management Agents of the U. S. Bureau of Commercial Fisheries and U. S. Coast Guard officers boarded three Soviet king crab factoryships operating in the eastern Bering Sea on various dates in April 1966. The boarding party in each case was well received and was given information on the Soviet Bristol Bay canned pack for this season. Each vessel has an automated three-line cannery; the canning is supervised by a trained fishery technologist. The factoryships are supplied by 12 picker boats (each manned by about 10 men) which set and pick the tangle nets. The crews of the factoryships and picker boats exceed 600, many of them women cannery workers.

LOSSES OF U. S. KING CRAB POTS:

Nearly $20,000 worth of U. S. king crab pots have reportedly been destroyed by Soviet trawlers in the Shumagin Islands area since mid-February of 1966. Shortly after a Soviet shrimp fishing fleet of 14 medium freezer trawlers moved into the Shumagin Islands, the U. S. fishermen in the Sand Point area began reporting losses of pots caused by the Soviet vessels. By April, losses in the Shumagins totaled 64 pots (each valued by our fishermen at $200 to $300). The losses occurred outside U. S. territorial waters.

OFF PACIFIC NORTHWEST (Washington and Oregon States):

Soviet: In the first week of May, an additional 8 large factory stern trawlers joined the Soviet fleet of 7 stern trawlers which were fishing off the southern Oregon coast at the end of April. (One of the new additions was a Tropik- or RTM-class factory stern trawler which is suited to tropical as well as northern waters, and is air-conditioned. The rest

of the large factory stern trawlers belong to the Maiakovskii- or BMRT-class.) The number of Soviet medium fishing trawlers was the same (22-23) as in April. But the number of refrigerated transports and base ships doubled in early May. With the increase in large factory stern trawlers (each has its own freezing capacity of about 30 tons a day) and support ships, the entire fleet's freezing capacity in early May was close to 1,000 metric tons a day. The fleet was fishing both Pacific ocean perch and some Pacific hake.

One base ship with 5 medium trawlers was catching hake 20-30 miles off Cape Meares (about 50 miles south of the mouth of the Columbia River).. After a few days, the weather became bad and the hake fleet joined the vessels fishing off Newport, Oregon. The rest of the fleet, including all 15 large stern trawlers, fished for ocean perch 20-30 miles off the Oregon coast between Newport and Florence (or between 44°15' N. and 44°50' N.).

On May 20, a total of 45 Soviet fishing vessels was sighted. Half were fishing off Newport, Oregon (between Yaquina Head and Heceta Head), and the other half off Willapa Harbor, Washington (about 20-30 miles off the mouth of the Columbia River). Most of the large stern trawlers were concentrated in the Willapa Harbor area. Most of the catches observed were Pacific hake. It seems that by then the Soviet fleet found a large concentration of hake near the mouth of the Columbia River and was actively exploiting it. During the last days of May 1966, the Soviet fishing vessels off Pacific Northwest were taking an average of 800-1,000 metric tons of rockfish (mostly Pacific ocean perch) and Pacific hake each day. About 34 Soviet fishing vessels (10 large stern factory trawlers and 24 medium trawlers) were operating in the Pacific Northwest at the time. By the end of May all of the Soviet fishing vessels moved out of the Newport area and were fishing from 12 to 25 miles offshore in depths of from 40 to 50 fathoms at points between Grace Harbor and Willapa Bay, slightly north of the mouth of the Columbia. Hake catches by the end of May dropped off. The U. S. Bureau of Commercial Fisheries research vessel John N. Cobb, which operated among the Soviet vessels off Willapa Bay from May 27-29, noted that although catches of up to 30,000 pounds of hake per two hours of trawling were observed, average catches were much less. A number of tows with catches of less than 5,000 pounds were observed.

On June 1, a total of 43 vessels was sighted, including 4 stern trawlers, over 30 medium trawlers, and 8 refrigerator fish carriers. During the last week of May, 6 large stern trawlers left the area off Pacific Northwest and transferred their operations to Queen Charlotte Sound where about 15 Soviet vessels were sighted early in June.

Soviet research vessels have been active throughout the month both in conducting independent research as well as in supporting the exploratory activities of the Soviet fishing fleets.

The activity of the Soviet fishery research vessel Adler during April and May is symptomatic of the active support the Soviet fishing fleets operating in new fishing areas always can count on. On April 9 she was sighted off Cascade Head (Oregon) on her way to Vancouver, B.C., where she obtained supplies, fuel and water (April 11-15). By April 20, the Adler was again steaming south to join the Soviet fishing fleet off Coos Bay. During the last week of April and in the first week of May she was actively criss-crossing the offshore waters between 100 and 200 fathoms deep helping the commercial fleet to locate schools of fish. It was at this time that she discovered large concentrations of Pacific hake.

In the last days of May the Adler again came to Vancouver, to resupply. While at Vancouver, she was found to have fishing gear aboard--a fact that prompted Canadian fishery officials to resurrect a law which prohibits any foreign vessel from entering Canadian territorial waters if it has fishing gear aboard, even though it may not engage in actual fishing.

On June 1, the research vessel Adler was sighted conducting research south of Amphitrite Point (Vancouver Island) not far from the Strait of Juan de Fuca.

IN THE GULF OF MEXICO AND CARIBBEAN:

Norwegian: On May 23, 1 of the 4 Norwegian shark-catching vessels which had been fishing off eastern and southeastern U. S. Atlantic coasts since June 1965 entered Pensacola, Florida, for supplies. The captain indicated this was probably his last trip to the Gulf; his catch was about 200 metric tons of "brown sharks."

Soviet: No precise information on Soviet fishing in this area is available.

In mid-May 1966, a group of 65 Soviet technical experts and instructors arrived at Havana, Cuba, to replace Soviet instructors who have been giving practical instruction for the past six months in fishing techniques to Cuban fishermen. The U.S.S.R. is maintaining a strong liaison group with the Cuban Institute of Fisheries, helping the Cubans in fishery research, fishing techniques, technology, the training of fishermen, construction of fishing vessels, and the general organization of the state-owned Cuban fishing industry. The Cubans--like the Soviet Union--are turning to fisheries as a major source of animal protein as well as a prime source for obtaining hard foreign currency.

IN NORTHWEST ATLANTIC:

Soviet: Soviet fishing activity increased slightly during the month. By mid-May, approximately 90 vessels were operating off southern New England. Several factory stern trawlers were deployed to the mid-Atlantic during the early part of the month, but some of them had returned by the month's end. In addition, the arrival of about 30 medium side trawlers increased Soviet fishing fleet to about 110 vessels by the end of May.

A total of 141 vessels (exclusive of duplication) was sighted during the month and identified as 34 factory stern trawlers, 10 large freezer factory trawlers, 17 large refrigerated side trawlers, 21 medium refrigerated side trawlers, 47 medium side trawlers, 5 refrigerated fish transports, 3 factory base ships, 3 fuel and water carriers and 1 tug. This compares to 128 vessels sighted during April 1966 and 125 reported in May 1965.

This fleet continued to operate in large groups dispersed along the 200 miles of the 100-fathom curve of the Continental Shelf from east of Atlantic City, New Jersey (Hudson Canyon), to south and southeast of the Nantucket lightship off Massachusetts coast. By the end of May, the fleet extended its operations eastward to the southwest and southeast Georges Bank.

The principal species of fish taken by the Soviets appeared to be whiting, red hake and large herring. Their catch compositions were inconsistent and varied from vessel to vessel. Although the majority of vessels was actively engaged in fishing operations the catches of fish were considered only moderate to poor.

Polish: One factory stern trawler was sighted fishing on Georges Bank on May 24. (5 Polish stern trawlers were fishing on Georges Bank in September 1965.)

OFF MID-ATLANTIC COASTS:

Soviet: Fishing effort off mid-Atlantic U. S. coast increased greatly during May. Exclusive of duplications, 74 vessels were sighted and identified as 53 factory stern trawlers, 6 large freezer factory trawlers, 9 large refrigerated side trawlers, 2 medium side trawlers and 4 refrigerated fish transports.

By mid-May between 60 and 70 Soviet vessels were dispersed along 200 miles of the 100-fathom curve from 45 miles northeast of Oregon Inlet (N.C.) to 90 miles east of Cape May, N. J. By the third week, these vessels returned to Georges Bank or to the fishing grounds off Nova Scotia and less than ten Soviet vessels remained in mid-Atlantic.

Heavy catches of fish appeared to be primarily scup (porgies) and whiting. Numerous trawls were observed bulging with fish--estimated catches of 30,000 to 40,000 pounds. There seemed to be little doubt that the Soviets were fishing in a productive scup area. This amazed Virginia fishermen who stated that they found little or no fish in these areas. (Normally, U. S. fishermen in these areas engage in other fisheries by the end of May when the scup season ends.)

U. S. fishermen were impressed and concerned about the size and catch capabilities of the Soviet stern trawlers. The fishermen link the Soviet success in catching fish when U. S. vessels are unable to do so to their ability to fish in greater depths and catch fish when they rise off the bottom. They also maintain that the Soviets have superior fish-finding devices.

This was the largest concentration of Soviet vessels to operate along the mid-Atlantic coast. Of particular interest was the Soviets' increased interest in scup. During March 1964 about 15 Soviet stern trawlers took substantial quantities of scup east of Virginia Capes.

Norwegian: Several longliners have moved south of Martha's Vineyard off Massachusetts coast to fish for sharks.

ALLEGED SOVIET FISHING FOR SALMON OFF PACIFIC NORTHWEST:

In mid-May several U. S. west coast fishermen reported to the Press that they had seen the Soviets fishing with gill nets for salmon in the dawn hours. On May 31, the director of the Washington Department of Fisheries stated that 16 out of 1,184 salmon caught by sport fishermen over Memorial Day weekend off Pacific Northwest were fish "recently marked by gill nets." The head (A. Chepur) of the Soviet fishing fleet operating off Pacific Northwest was asked by U.S. public relations men and newsmen whether his fleet was fishing for salmon. He denied that any of his vessels is either equipped for salmon fishing or is permitted to fish for that species. He did allow that individual salmon may be caught incidentally during trawling and is eaten by the crew.

Because it is known that the Soviet Ministry of Fisheries does not look with favor on high-seas fishing for salmon, there seems to be a reasonable doubt that the Soviets are fishing salmon commercially.

INTERVIEW WITH SOVIET FISHERMEN:

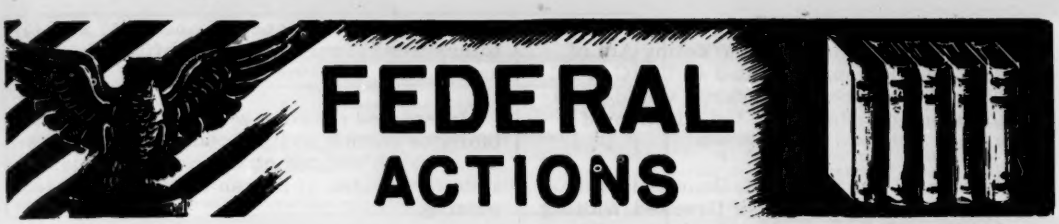
On May 28, a party of Washington's Legislature, representatives of the West Coast Trollers Association, and newsmen chartered a boat to pay a private visit to the Soviet fishing fleet. Aboard were three members of the Washington State Legislature's interim Fisheries Committee (Senator Ted Peterson and Representatives Dwight Hawley and Chet King), the public relations director of the Congress of American Fishermen (Dick O'Keef), a newspaper reporter (Stanton H. Patty of the Seattle Times), and a radioman (Bob Ginther) of the King Broadcasting Company.

Several weeks previous, O'Keef tried to get aboard the flagship (the Churkin) of the Soviet fleet operating off the Oregon coast, but was unable to do so even on written request. On May 28, however, the Soviet Commander of the fishing fleet, residing aboard the Churkin did allow O'Keef and 2 newsmen to come aboard for an interview. It was obvious that he had received permission from the Soviet authorities to do so. During the interview, the Soviet Commander Aleksander Chepur made several interesting statements: (1) The Soviet vessels fishing off the U. S. coasts may only approach within 15 miles of shore; if any vessels stray inside 15 miles, they are doing so in violation of this Soviet operational directive; (2) the Soviet Union will stay in the Northeastern Pacific fishing areas at least until mid-September 1966, unless instructed differently by the Soviet Ministry of Fisheries.

On the weekend of June 4-5, another group of newsmen was allowed aboard Soviet fishing vessels. This time, they took pictures for a Seattle television program.

LOBSTER SHEARS FOR THE HOME DINER

Lobster eating for the home diner is made much easier by using a new type of lobster shears recently devised. The shears readily cut through the toughest of lobster shells and eliminates trying to retrieve bits of meat from shelled-in places. The shears have fine pointed blades which cut the joints wide open allowing the diner to pick out the meat neat and clean in one piece. (Science News, April 16, 1966.)



Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

The following firms have applied for fishing vessel construction differential subsidies to aid in the construction of vessels to engage in various fisheries:

Old Colony Trawling Corp., 220 Northern Ave., Boston, Mass. 02110, has applied for a fishing vessel construction differential subsidy to aid in the construction of a 131-foot overall length steel vessel to engage in the fishery for groundfish and flounder. The Bureau of Commercial Fisheries, U. S. Department of the Interior, published the notice of the hearing in the Federal Register, May 5, 1966.

American Stern Trawlers, Inc., 26 Broadway, New York, N. Y. 10004, steel vessel with a length between perpendiculars of 262 feet to engage in the fishery for bottomfish, hake, and herring in the North Pacific Ocean. Notice of the hearing appeared in the Federal Register, June 1, 1966.

Hearings on the economic aspects of the applications were scheduled to be held.

* * * * *

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the purchase of used fishing vessels:

James Peyton Allenbaugh, 724 Terrace Ave., Aberdeen, Wash. 98520, 42-foot wood vessel to engage in the fishery for crabs, salmon, and tuna. Notice of the application was published by the U. S. Department of the Interior's Bureau of Commercial Fisheries in the Federal Register, May 5, 1966.

John Clifford Edwards, 61 O St., Hoquiam, Wash. 98550, 49.6-foot registered length wood vessel to engage in the fishery for crabs, tuna, and bottomfish. Notice of the application was published in the Federal Register, May 5, 1966.

Gilbert Lee Krigbaum, Westport, Wash., 48-foot registered length wood vessel to engage in the fishery for salmon, albacore, and crabs. Notice of the application was published in the Federal Register, May 18, 1966.

Howard H. Conn, P. O. Box 306, Petersburg, Alaska 99833, 50-foot registered length wood vessel to engage in the fishery for halibut, salmon, black cod, Dungeness crab, and king crab. Notice of the application was published in the Federal Register, June 4, 1966.

John C. Morgan, P. O. Box 532, Naples, Fla. 33940, 37-foot wood vessel to engage in the fishery for mackerel, pompano, and grouper. Notice of the application was published in the Federal Register, June 7, 1966.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).

Note: See Commercial Fisheries Review, June 1966 p. 101.

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PROPOSED U. S. STANDARDS FOR GRADES OF FROZEN HEADLESS DRESSED WHITING:

Notice of proposed standards for grades of frozen headless dressed whiting was published in the Federal Register, May 18, 1966, by the U. S. Department of the Interior in ac-

cordance with the authority contained in Title II of the Agricultural Marketing Act of August 14, 1946, as amended (7 U.S.C. 1621-1627). The proposed standards would be issued as an amendment by the addition of a new Part 271.

The new Part 271, U. S. Standards for Grades of Frozen Headless Dressed Whiting includes sections on: (1) description of product; (2) grades of frozen headless dressed whiting; (3) determination of the grade; (4) definitions and methods of analysis; and (5) tolerances for certification of officially drawn samples.

Interested persons were given the opportunity to submit written comments, suggestions, or objections on the proposed standards for grades of frozen headless dressed whiting.

The Notice of Proposed Rule Making as published in the Federal Register follows:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Part 271]

FROZEN HEADLESS DRESSED WHITING

U.S. Standards for Grades

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956 (16 U.S.C. 742e), it is proposed to amend Title 50 Code of Federal Regulations by the addition of a new Part 271. The purpose of this amendment is to issue standards for grades of frozen headless dressed whiting in accordance with the authority contained in Title II of the Agricultural Marketing Act of August 14, 1946, as amended (7 U.S.C. 1621–1627).

It is the policy of the Department of the Interior whenever practicable, to afford the public an opportunity to participate in the rule making process. Accordingly, interested persons may submit written comments, suggestions, or objections with respect to the proposed amendment to the Director, Bureau of Commercial Fisheries, U.S. Fish and Wildlife Service, Washington, D.C., 20240, within 30 days of the date of publication of this notice in the FEDERAL REGISTER.

DONALD L. MCKERNAN,
Director.

MAY 12, 1966.

PART 271—U.S. STANDARDS FOR GRADES OF FROZEN HEADLESS DRESSED WHITING [1]

Sec.

271.1 Description of the product.
271.2 Grades of frozen headless dressed whiting.
271.11 Determination of the grade.
271.21 Definitions and methods of analysis.
271.25 Tolerances for certification of officially drawn samples.

AUTHORITY: The provisions of this Part 271 are issued under sec. 6, 70 Stat. 1122; 16 U.S.C. § 742e; and secs. 303 and 205, 60 Stat. 1087, 1090, as amended; 7 U.S.C. 1622, 1624.

§ 271.1 Description of the product.

The product described in this part consists of clean, wholesome whiting (silver hake) *merluccius bilinearis, merluccius albidus;* completely and cleanly headed and adequately eviscerated. The fish are packaged and frozen in accordance with good commercial practice and are maintained at temperatures necessary for the preservation of the product.

[1] Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act.

§ 271.2 Grades of frozen headless dressed whiting.

(a) "U.S. Grade A" is the quality of frozen headless dressed whiting that (1) possess a good flavor and odor and that (2) for those factors that are rated in accordance with the scoring system outlined in this part, have a total score of 85 to 100 points.

(b) "U.S. Grade B" is the quality of frozen headless dressed whiting that (1) possess at least reasonably good flavor and odor and that (2) rate a total score of not less than 70 points for those factors of quality that are rated in accordance with the scoring system outlined in this part.

(c) "Substandard" or "Utility" is the quality of frozen headless dressed whiting that meet the requirements of § 271–1 but that otherwise fail to meet the requirements of "U.S. Grade B."

§ 271.11 Determination of the grade.

In a plan under Continuous USDI Inspection the grade is determined by examining the product for factors 1–10 in the thawed state and factor 11 in the cooked state. For lot inspection, examination of the product for factors 1, 2, and 3 is carried out in the frozen state and 4–10 in the thawed state. Factor 11 is examined in the cooked state.

(a) *Factors rated by score points.* Points are deducted for variations in the quality of each factor in accordance with the schedule in Table 1. The total of

TABLE 1.—SCHEDULE OF POINT DEDUCTIONS PER SAMPLE

	Factors scored	Method of determining score	Deduct
		FROZEN STATE (LOT INSPECTION ONLY)	
1	Arrangement of product [1]	Small degree: 10 percent of fish twisted or bellies and backs not facing the same direction. Large degree: More than 10 percent of fish twisted, void present or some fish cross packed.	2 5
2	Condition of packaging (overall assessment).	Poor: Packaging material has been soaked, softened or deteriorated.	2
3	Dehydration	Small degree: Slight dehydration of the exposed surfaces. Large degree: Deep dehydration of the exposed surfaces.	3 5
		THAWED STATE	
4	Minimum size: Fish 2 oz. or over are of acceptable size.	Number of fish less than 2 oz. per lb.: Over 0—not over 0.5 Over 0.5—not over 1.0 Over 1.0—not over 2.0 Over 2.0	5 10 20 30
5	Uniformity: Weight ratio of fish remaining. The 10 percent largest fish divided by the 10 percent smallest fish.[1]	Weight ratio 10 percent smallest and 10 percent largest: Over 2.0—not over 2.4 Over 2.4—not over 2.8 Over 2.8—not over 3.2 Over 3.2—not over 3.6 Over 3.6	2 5 10 20 30
6	Heading [1]	Small degree: 10 percent of fish carelessly cut Moderate degree: Over 10 percent of fish carelessly cut.	5 15
7	Evisceration (overall assessment).	Small degree: Slight evidence of viscera Moderate degree: Moderate amounts of spawn, viscera, etc. Large degree: Large amounts of viscera, spawn, etc.	2 10 30
8	Scaling [1]	Small degree: 10 percent of fish not well scaled Large degree: Over 10 percent of fish not well scaled.	2 5
9	Color of the exposed surfaces (overall assessment).	Small degree: Minor darkening, dulling Large degree: Objectionably dark, brown, dull.	2 5
10	Bruises and split or broken skin.	Presence of bruises and/or broken or split skin per pound: Over 0—not over 0.5 Over 0.5—not over 1.0 Over 1.0—not over 1.5 Over 1.5—not over 2.0 Over 2.0	1 2 4 7 10

TABLE 1.—SCHEDULE OF POINT DEDUCTIONS PER SAMPLE—Continued

FROZEN STATE (LOT INSPECTION ONLY)

COOKED STATE

	Factors scored	Method of determining score	Deduct
11	Texture: (overall assessment)	Small degree: Moderately dry, tough, mushy, rubbery, watery, stringy.	5
		Large degree: Excessively dry, tough, mushy, rubbery, watery, stringy.	15

[1] 10 percent of fish refers to 10 percent by count rounded to nearest whole fish.

points deducted is subtracted from 100 to obtain the score. The maximum score is 100; the minimum score is 0.

(b) *Factors not rated by score points.* The factor of "flavor and odor" is evaluated organoleptically by smelling and tasting after the product has been cooked in accordance with § 278.21.

(1) Good flavor and odor (essential requirements for a U.S. Grade A product) means that the cooked product has the typical flavor and odor of the species and is free from rancidity, bitterness, staleness, and off-flavors and off-odors of any kind.

(2) Reasonably good flavor and odor (minimum requirements of a U.S. Grade B product) means that the cooked product is lacking in good flavor and odor, but is free from objectionable off-flavors and off-odors of any kind.

§ 271.21 Definitions and methods of analysis.

(a) *Selection of the sample unit.* The sample unit consists of the primary container and its entire contents. The whiting are examined according to Table 1. Definitions of factors for point deductions are as follows:

(b) *Examination of sample, frozen state.* When this product is examined under Continuous USDI Inspection, the samples are examined for factors 1, 2, and 3 in Table 1 in the thawed state. When the product is lot inspected, the samples are examined for factors 1, 2, and 3 in Table 1 in the frozen state.

(1) *"Arrangement of product"* refers to the packing of the product in a symmetrical manner, bellies or backs all facing in the same direction, fish neatly dovetailed.

(2) *"Condition of the packaging material"* refers to the condition of the cardboard or other packaging material of the primary container. If the fish is allowed to stand after packing and prior to freezing, moisture from the fish will soak into the packaging material and cause deterioration of that material.

(3) *"Dehydration"* refers to the presence of dehydrated (water-removed) tissue on the exposed surfaces of the whiting. Slight dehydration is surface dehydration which is not color-masking. Deep dehydration is color-masking and cannot be removed by scraping with a fingernail.

(c) *Examination of sample, thawed state.* Thawed state means the state of the product after being thawed. Thawing the sample is best accomplished by enclosing the sample in a film type bag and immersing in an agitated water bath held at 68° F., ±2° F. Allow the product to remain immersed until thawed. Alternatively when the facilities are lacking for water thawing, the sample may be thawed by slacking it out at a temperature between 30° to 40° F. on an aluminum tray from 2 hours for a 1½-pound sample to 8 hours for a 10-pound sample.

(1) *"Minimum size"* refers to the size of the individual fish in the sample. Fish 2 ounces or over are considered acceptable. Smaller fish cannot be cooked uniformly with acceptable size fish. Separate the fish of unacceptable size, divide their number by the weight of the sample in pounds, and apply to Table 1. Example—four fish of unacceptable size in a 5-pound package is $\frac{4}{5}$ =0.8, a 10 point deduction

(2) *"Uniformity."* From the fish remaining, select by count 10 percent (minimum of one fish) of the largest and 10 percent (minimum of one fish) of the smallest and divide the largest weight by the smallest weight to get a weight ratio.

(3) *"Heading"* refers to the condition of the fish after they have been headed. The fish should be cleanly headed behind the gills and pectoral fins. No gills, gill bones, or pectoral fins should remain after the fish have been headed.

(4) *"Evisceration"* refers to the cleaning of the belly cavities of the fish. All spawn, viscera, and belly strings should be removed.

(5) *"Scaling"* refers to the satisfactory removal of scales from the fish.

(6) *"Color of the cut surfaces"* refers to the color of the cut surfaces of the fish after heading and other processing.

(7) *"Bruises and broken or split skin"* refers to bruises over one-half square inch in area and splits or breaks in the skin more than one-half inch in length which are not part of the processing.

(d) *Examination of sample, cooked state.* Cooked state means the state of the sample after being cooked. Cooking the sample is best accomplished by inserting the sample into a film type bag and submerging it into boiling water for from 18–20 minutes. A minimum of three fish per sample unit shall be cooked.

(1) *"Texture defects"* refers to the absence of normal textural properties of the cooked fish flesh, which are tenderness, firmness, and moistness without excess water. Texture defects are dryness, softness, toughness, and rubberyness.

(e) *General definitions.*

(1) *Small* (overall assessment) refers to a condition that is noticeable but is only slightly objectionable.

(2) *Moderate* (overall assessment) refers to a condition that is distinctly noticeable but is not seriously objectionable.

(3) *Large* (overall assessment) refers to a condition which is both distinctly noticeable and seriously objectionable.

§ 271.25 Tolerances for certification of officially drawn samples.

The sample rate and grades of specific lots shall be certified in accordance with Part 260 of this chapter (Regulations Governing Processed Fishery Products).

* * * * *

FEDERAL SUBSIDIES FOR CONSTRUCTION OF NEW TUNA VESSELS APPROVED:

An appeal by the American Tuna Boat Association, San Diego, Calif., to prevent the addition of 5 new tuna vessels to the United States fishing fleet has been denied, the U. S. Department of the Interior's Bureau of Commercial Fisheries announced May 18, 1966. The Association sought to reverse a hearing examiner's decision that Federal subsidies should be granted to permit building the vessels in United States shipyards. It argued that enlargement of the tuna fleet would create economic hardship among other owners now operating profitably.

The subsidies are authorized by the United States Fishing Fleet Improvement Act, which is administered by the Bureau, said Donald L. McKernan, Bureau Director. Under certain conditions the Act permits paying the difference between building a vessel in United States shipyards and in less expensive foreign shipyards, with a maximum subsidy of 50 percent of the cost of having the vessel built in an American shipyard. United States fishermen are required by law to have their vessels constructed in this country.

The amount of the subsidies will be determined after the United States Maritime

Commission approves specifications, studies bids for construction, and estimates the cost of building the vessels in foreign countries.

The decision signed by Clarence F. Pautzke, Deputy Assistant Secretary for Fish and Wildlife and Parks, upheld initial decisions made by a Hearing Examiner following extensive hearings late in 1965.

The Deputy Assistant Secretary's ruling, made after a hearing in La Jolla, Calif., granted construction subsidies to 5 San Diego firms.

* * * * *

NEW FISHERY ATTACHÉS APPOINTED TO TOKYO AND COPENHAGEN POSTS:

The appointment of new fishery attachés in United States Embassies in Tokyo and Copenhagen was announced May 9, 1966, by Secretary of the Interior Stewart L. Udall. They will begin their two-year tours of duty about June 1.

Clinton E. Atkinson takes over from Arnie J. Suomela in Tokyo, and Arthur M. Sandberg replaces Andrew W. Anderson in Copenhagen. Suomela and Anderson, both long-time fishery administrators, have served at their posts five years and are returning to the United States to retire.

The fisheries attaché program is operated by the Department of State in cooperation with the Department of the Interior. Persons named under this program are appointed Foreign Service Reserve Officers of the State Department.

A fishery attaché gathers information to keep the United States Government and the fishing industry abreast of fishing operations, advances in technology and processing, and market conditions in foreign nations. He seeks to develop foreign markets for American fishery products and to locate supplies to meet the demands of the American public. He interprets the United States position to foreign nations and works to resolve international fishing problems.

Atkinson has been a scientist with Interior's Bureau of Commercial Fisheries for 28 years, specializing in fisheries research, administration, and international fisheries commissions. He has made many trips to Japan, has a working knowledge of the language, and is widely known in Japanese fishing circles. He has first-hand understanding of fishing's importance in the Japanese economy--and of the fact that United States and Japanese fishing industries have many close ties through trade and common conservation interests.

Clinton E. Atkinson

Atkinson was graduated in 1937 from the University of Washington, College of Fisheries. He now is a candidate for a Doctor of Philosophy degree at the University of Hokkaido in Japan.

Sandberg, in assuming the Copenhagen post, will be concerned with the fisheries of 22 European nations. He joined Federal Government service in 1941 after 10 years in the fishing industry. He has worked with the Bureau of Commercial Fisheries for 25 years, most recently as an international trade specialist and chief of the Branch of Foreign Trade and Economic Services. A major part of his work was to follow United States foreign policy as it relates to international trade agreements.

Arthur M. Sandberg

In 1946, Sandberg served in the secretariat of the International Whaling Conference. In 1948, he planned and conducted a survey of Western Europe as a market for, and competitor to, United States fishery products. He has worked closely with the Interdepartmental Trade Agreements Committee and has participated in international trade negotiations and conferences. Sandberg attended business college in Duluth, Minn., where he specialized in accounting, and was graduated in 1939.

BUREAU OF COMMERCIAL FISHERIES AND
BUREAU OF SPORT FISHERIES AND WILDLIFE

REGULATIONS PROPOSED TO START NEW ANADROMOUS FISHERIES PROGRAM:

Proposed regulations to govern a new Federal program to conserve and develop the Nation's anadromous fishery resources were announced by the U. S. Department of the Interior on June 10, 1966. Anadromous fish, such as striped bass, salmon, and shad, live in the ocean and return to fresh water to spawn.

The Anadromous Fish Act (P. L. 89-304), passed in October 1965, provides funds for States and other non-Federal interests to finance up to 50 percent of the cost of projects such as stream improvement and construction of fishways, spawning channels, hatcheries, and research. The Act authorizes appropriation of $25 million through June 30, 1970.

Thirty-one States having anadromous fishery resources, including Coastal States and those bordering the Great Lakes, are eligible for funds under the new program. The regulations spell out requirements for loan eligibility and specify that all research must be coordinated to avoid costly duplication.

Stanley A. Cain, Assistant Secretary for Fish and Wildlife and Parks, said the Anadromous Fish Act will be administered jointly by Interior's Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife. He said cooperative administration is desirable because the legislation concerns both commercial and sport fishermen.

Funds to launch the program have been authorized by Congress. For Fiscal Year 1967, which began July 1, 1966, the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife each will have $2.5 million for loans among the 31 eligible states. A ceiling of $1 million has been placed on the amount that can be granted in any one year to a single state.

Interested persons were given the opportunity to submit written comments, suggestions, or objections on the proposed regulations.

A notice of Proposed Rule Making as published in the Federal Register of June 9, 1966, follows:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Part 401]

ANADROMOUS FISHERIES CONSERVATION, DEVELOPMENT AND ENHANCEMENT

Notice of Proposed Rule Making

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by the Anadromous Fish Act of 1965 (P.L. 89-304), it is proposed to adopt 50 CFR Part 401 as set forth below. The purpose of these regulations is to set forth procedures to be used by the Secretary in providing financial and other assistance, through cooperative agreements, to State agencies and other non-Federal interests in the conservation, development and enhancement of the commercial and sport anadromous fisheries resources of the Nation and fishes of the Great Lakes which ascend streams to spawn.

On February 14, 1966, a letter and a copy of the proposed regulations were sent concerned State Fishery agencies for their review. Also, on February 14, a letter signed by the Secretary of the Interior was sent the Governor of each State, with a copy of the Anadromous Fish Act, informing them of meetings scheduled as follows for discussion of the proposed regulations:

Boston, Mass.	Feb. 18
St. Petersburg Beach, Fla.	Feb. 24
Ann Arbor, Mich.	Mar. 8
Portland, Oreg.	Mar. 10

In addition, on February 15 a news release was given wide distribution which, among other things, invited non-Federal interests other than the State fishery agencies to attend the four meetings.

These meetings were held as scheduled and were attended by representatives of 20 of the 31 eligible States. Six non-Federal interests other than the States were also present. Reaction to the proposed regulations was very favorable and only minor revisions resulted.

Program objectives, goals and priorities, together with determination to be made of the distribution of funds to eligible grantees require further attention within the U.S. Fish and Wildlife Service.

Interested persons may submit written comments, suggestions, or objections with respect to the proposed regulations to the Director, Bureau of Commercial Fisheries or the Director, Bureau of Sport Fisheries and Wildlife, Department of the Interior, Washington, D.C., 20240, within 30 days after the date of publication of this notice in the FEDERAL REGISTER.

Sec.

401.1 Definitions.
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401.18 Officials not to benefit.
401.19 Patents and inventions.
401.20 Convict labor.
401.21 Civil rights.

AUTHORITY: The provisions of this Part 401 issued under P.L. 89-304.

§ 401.1 Definitions.

As used in this part, terms shall have the meanings ascribed in this section.

(a) *Secretary.* The Secretary of the Interior or his authorized representatives.

(b) *Act.* Public Law 89-304, the Anadromous Fish Act of 1965.

(c) *State.* Any State of the United States which has had or now contains anadromous fish and the States bordering the Great Lakes.

(d) *State fishery agency.* Any department(s), division(s), commission(s), or official(s) of a State empowered under its laws to administer the commercial or sport fishery.

(e) *Non-Federal interest.* Any organization, association, institution, business, school, individual or group of individuals, municipality and others outside the Federal Government in addition to State fishery agencies who desire to cooperate within the terms of the Act.

(f) *Cooperator.* A State fishery agency or other non-Federal interest participating in a cooperative agreement with the Secretary.

(g) *Anadromous fish.* Aquatic, gill breathing, vertebrate animals bearing paired fins which migrate to and spawn

in fresh water, but which spend part of their life in salt water; also, fish which spend part of their life in the Great Lakes and spawn in streams tributary to the Great Lakes.

(h) *Cooperative agreement.* (1) The documentation describing conservation, development, and enhancement activities to be carried on as provided by the Act. Such agreements shall set forth the responsibilities of the cooperators and the Secretary, the anticipated benefits of the undertaking, the estimated cost to each cooperator, the term of the agreement, disposition of real or personal properties, and such other information as is appropriate.

(2) Cooperative agreements constitute the basis for projects and shall conform to the documentation requirements prescribed by the Secretary.

(i) *Project.* Any undertaking involving the conservation, enhancement and development of anadromous fish. A project is established upon execution of a cooperative agreement.

§ 401.2 Submission of applications.

Proposed cooperative agreements shall be submitted to the concerned Regional or Area Office.

§ 401.3 Prosecution of work.

(a) The cooperator shall carry projects through to a stage of completion acceptable to the Secretary with reasonable promptness. Failure to render satisfactory progress reports or failure to complete the project to the satisfaction of the Secretary shall be cause for the Secretary to withhold further payments until the project provisions are satisfactorily met. Projects may be terminated upon determination by the Secretary that satisfactory progress has not been maintained. The Secretary shall have the right to inspect and review work being done at any time.

(b) Research and/or development work shall be continuously coordinated by the cooperator with studies conducted by others to avoid unnecessary duplication.

(c) All work shall be performed in accordance with applicable State laws, except when in conflict with Federal laws or regulations, in which case Federal laws or regulations shall prevail.

§ 401.4 General information for the Secretary.

Before any Federal funds may be obligated for any project the cooperator shall furnish to the Secretary upon his request, information regarding the laws affecting anadromous fish and the authority of a cooperator to participate in the benefits of the Act.

(a) *Document signature.* Individuals authorized to sign project documents under the Commercial Fisheries Research and Development Act or the Federal Aid in Fish Restoration Act may likewise sign cooperative agreements under this Act.

(b) *Program information.* The Secretary may, from time to time, request, and the cooperators shall furnish, information relating to the administration and maintenance of any project established under the Act.

§ 401.5 Availability of funds.

Language appearing in Appropriation Acts providing funds for this program will govern the period during which the funds may be obligated.

§ 401.6 Payments to cooperators.

Payments shall be made to cooperators as work described in cooperative agreements progresses and is completed.

§ 401.7 Forms of vouchers.

Vouchers on forms provided by the Secretary and certified as therein prescribed showing amounts expended on each project, and the Federal portion claimed to be due on account thereof, shall be submitted to the Secretary by the cooperator.

§ 401.8 Property as matching funds.

The non-Federal share of the cost of projects may be in the form of real or personal property. To establish the value of such property the cooperator shall furnish such market value appraisal information as the Secretary may require prior to execution of a cooperative agreement.

§ 401.9 Economy and efficiency of operations.

No cooperative agreement shall be executed until the cooperator has shown to the satisfaction of the Secretary that appropriate and adequate means shall be employed to achieve economy and efficiency in the completion of the project.

§ 401.10 Ownership of property.

When real property is acquired pursuant to the provisions of the Act, title to such property or interest therein shall be vested in the United States, and the conveying instrument shall recite the United States of America as the grantee. However, if the Secretary determines that under the terms of the cooperative agreement, the intent and purpose of the Act may be better served by State ownership of such property, an appropriate transfer may be made. When real or personal property is utilized by the State as matching funds, title to such property shall remain in the State. When real or personal property is utilized as matching funds by a cooperator other than the State, title shall be in the State unless otherwise specified in the cooperative agreement.

§ 401.11 Personnel.

The cooperator shall maintain an adequate and competent force of employees to initiate and carry cooperative agreements to satisfactory completion. Personnel employed on projects shall be selected on the basis of their competence to perform the services required and shall conduct their duties in a manner acceptable to the Secretary.

§ 401.12 Inspection.

Supervision of each project shall be as specified in the cooperative agreement and shall include adequate and continuous inspection. The project will be subject at all times to Federal inspection.

§ 401.13 Records retention.

All records of accounts and reports, with supporting documentation thereto, will be retained by the cooperator for a period of three years after final audit is made by the Federal Government.

§ 401.14 Reporting.

Progress and final reports shall be submitted to the Secretary by the cooperator in accordance with reporting requirements prescribed by the Secretary. Reports should be in the form of publications whenever appropriate. Progress and final reports will be placed in permanent depository for future reference.

§ 401.15 Safety and accident prevention.

In the performance of each project, the cooperator shall comply with all applicable Federal, State and local laws governing safety, health and sanitation. The cooperator shall be responsible for ascertaining that all safeguards, safety devices and protective equipment are provided. The cooperator will take any other needed actions reasonably necessary to protect the life and health of employees on the job, the safety of the public, and the protection of property used in connection with the performance of the work covered by plans, specifications, and estimates relating to the project.

§ 401.16 Contracts.

Supply, service, equipment and construction contracts, other than research and development contracts and contracts for professional services, involving an expenditure of $2,500 or more entered into by a cooperator for the execution of approved project activities, shall be based upon free and open competitive bids. If a contract is awarded to other than the lowest responsible bidder, the payment of the Federal portion of the cost of the project shall be based on the lowest responsible bid, unless it is satisfactorily shown that it was advantageous to the project to accept a higher bid. Upon request, the cooperator shall certify and promptly furnish to the Secretary a copy of each contract executed and copies of all bids received concerning the contract. Contracts for research, development and professional services may be negotiated, provided that the Secretary is satisfied that adequate steps are taken to insure economical and efficient services and the impartial selection of contractors.

§ 401.17 Statements and payrolls.

The regulations of the Secretary of Labor applicable to contractors and subcontractors (29 CFR Part 3), made pursuant to the Copeland Act, as amended (40 U.S.C. 276c), and to aid in the enforcement of the Anti-Kickback Act (18 U.S.C. 874) are made a part of the regulations in this part by reference. The cooperator will comply with the regulations in this part and any amendments or modifications thereof and the cooperator's prime contractor will be responsible for the submission of statements required of subcontractors thereunder. The foregoing shall apply except as the Secretary of Labor may specifically provide for reasonable limitation, variations, tolerances, and exemptions.

§ 401.18 Officials not to benefit.

No Member of, or Delegate to, Congress, or Resident Commissioner, shall be admitted to any share or any part of an agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

§ 401.19 Patents and inventions.

Determination of the patent rights in any inventions or discoveries resulting from work under cooperative agreements entered into pursuant to the Act shall be governed by the Statement of Government Patent Policy promulgated by the President in his memorandum of October 10, 1963 (3 CFR, 1963 Supp., p. 238, 28 F.R. 10943).

§ 401.20 Convict labor.

In connection with the performance of work, the cooperator agrees not to employ any person undergoing sentence of imprisonment at hard labor.

§ 401.21 Civil rights.

Each cooperative agreement shall contain a statement of assurance executed by the cooperator providing that the project will be carried out in accordance with Title VI, Nondiscrimination in Federally Assisted Programs, of the Civil Rights Act of 1964 and with the Secretary's regulations promulgated thereunder.

STEWART L. UDALL,
Secretary of the Interior.

Eighty-Ninth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

COMMERCIAL FISHERY RESOURCES SURVEY: Survey of Fishery Resources: Hearing before the Subcommittee on Merchant Marine and Fisheries of the Committee on Commerce, United States Senate, 89th Congress, 2nd session, on S. J. Res. 29, a joint resolution to authorize and direct the Bureau of Commercial Fisheries to conduct a survey of the marine and freshwater commercial fishery resources of the United States, its territories and possessions, April 19, 1966, Serial No. 89-50, 37 pp., printed. Contents include comments, statements and letters of various agencies, Federal and State officials.

Senate Committee on Commerce, May 17, 1966, in executive session, ordered favorably reported, with amendment, S. J. Res. 29.

Senate June 2, 1966, reported (S. Rept. 1202), with amendments, S. J. Res. 29.

Senate June 7, 1966, passed, with committee amendments, S. J. Res. 29. The title was amended so as to read: "Joint resolution to authorize and direct the Secretary of the Interior to conduct a survey of coastal and fresh-water commercial fishery resources of the United States, its territories, and possessions." The text of S. J. Res. 29 as passed, is printed in Congressional Record, June 7, 1966 (pp. 11850-11851), together with an excerpt from the committee report (No. 1202) explaining the purpose of the resolution.

Senate-passed bill, S. J. Res. 29, June 8, 1966, was referred to House Committee on Merchant Marine and Fisheries.

Sen. Tower spoke in the Senate (Congressional Record, June 8, 1966, p. 12047), commending the Committee on Commerce for reporting S. J. Res. 29. He stated that it is hoped that this legislation which passed June 7, 1966, will enable the Bureau of Commercial Fisheries to produce a report which will better enable our domestic fishermen to take advantage of our enormous marine resources.

COMMODITY PACKAGING AND LABELING: Senate Committee on Commerce, May 13, 1966, in executive session, ordered favorably reported (in nature of a substitute bill) S. 985, proposed Fair Packaging and Labeling Act of 1966.

H. R. 15102 (Love) introduced in House May 17, 1966, to Committee on Interstate and Foreign Commerce.

S. Rept. 1186, Fair Packaging and Labeling Act (May 25, 1966, report from the Committee on Commerce, together with minority and individual views, U. S. Senate, 89th Congress, 2nd session, to accompany S. 985), 44 pp., printed. Committee reported bill favorably with amendment. Discusses purpose, background and need, regulatory framework, mandatory provisions, discretionary sections, State-Federal relations, costs, agency comments, consumer interests, fair packaging and labeling, changes in existing law.

Senate May 26, 1966, reported during adjournment on May 25 under prior authorization (S. Rept. 1186) on S. 985, with amendment, and with minority and individual views.

At conclusion of early morning session June 6, 1966, S. 985 came down as Senate's unfinished business but was again temporarily put aside.

Senate June 8, 1966, continued its consideration of S. 985, taking the following actions on amendments offered to committee amendment (in nature of a substitute for the bill):

Adopted: Lausche amendment providing that definitions promulgated by Administrator of Pure Food and Drug Act, describing composition of certain consumer products, shall be controlling upon the administrator of the program embodied in the bill; and Monroney amendment providing that no regulation adopted under this legislation shall preclude the orderly disposal of packages in inventory or with the trade as of the effective date of the regulation; and

Rejected: (motion to reconsider tabled) Cotton amendment to eliminate language in the bill to establish procedures for the development of standards of weights or quantities for the retail distribution of consumer commodities.

Offered but as yet unacted on was Morton amendment providing that the owner of a brand, name, or trademark shall be deemed to retain his property rights therein,

and in the trade and public good will symbolized thereby, regardless of any sale or transfer of the goods to which such brand, name or trademark related.

Senate June 9, 1966, passed with amendment S. 985.

ESTUARINE INVESTIGATIONS: Sen. Tydings inserted in Congressional Record, June 1, 1966 (pp. 11397-11398), an article written by Eric Wentworth, which appeared in the May 1, 1966, edition of the Washington Post, stressing the danger of pollution in our Nation's estuaries. The article stated that Sen. Tyding's bill, S. 3240, calling on the Interior Department to make a 3-year, $3 million comprehensive study of estuaries and their problem, is a concrete step that would focus attention on estuaries as a special problem. The article stressed the importance of our Nation's estuaries as areas for recreation as well as important sources of food and a livelihood for many people, and urged that ways be found of stopping the further pollution of these areas.

The Subcommittee on Fish and Wildlife Conservation of the House Committee on Merchant Marine and Fisheries will hold hearing June 16, 1966, on H. R. 13447, to authorize the Secretary of the Interior in cooperation with the States to preserve, protect, develop, restore, and make accessible estuarine areas of the Nation which are valuable for sport and commercial fishing, wildlife conservation, recreation and scenic beauty.

FISH AND WILDLIFE COORDINATION ACT AMENDMENTS: Subcommittee on Fish and Wildlife of House Committee on Merchant Marine and Fisheries May 13, 1966, continued hearings on H.R. 9492, to amend the Fish and Wildlife Coordination Act to provide adequate notice and opportunity for the Secretary of the Interior and State fish and wildlife agencies to conduct studies on the effects of projects licensed by Federal agencies on fish and wildlife resources; H.R. 14414, to amend the Fish and Wildlife Coordination Act to make it applicable to the Atomic Energy Commission, the Federal Power Commission, and to permittees and licensees of such commissions; and H.R. 14455, to repeal section 9 of the Fish and Wildlife Coordination Act. Testimony was heard from Dr. Stanley A. Cain, Assistant Secretary, Fish and Wildlife and Parks, Department of the Interior.

FISHERIES: Sen. Bartlett inserted in Congressional Record, June 9, 1966 (pp. 12147-12148), an address given by DeWitt Gilbert, editor of Pacific Fisherman magazine and a member of the International Pacific Salmon Commission, before the Chamber of Commerce of Astoria, Oreg. Mr. Gilbert spoke of the great number of nations which have established 12-mile territorial fishing zones; of international agreements designed to protect fish resources against shortsighted overexploitation; and of the individual's resource responsibility.

FISHERMEN'S PROTECTIVE ACT AMENDMENT: H.R. 15362 (Van Deerlin) introduced in House May 31, 1966, to amend the act of August 27, 1954, relating to the seizure of vessels of the United States by foreign countries; to Committee on Merchant Marine and Fisheries.

FISHERY CONSERVATION: Sen. Magnuson inserted in Congressional Record, June 1, 1966 (pp. 11451-11452), the text of an editorial which appeared in an issue of the British fishery trade journal, Fishing News International titled "Peru, Fish Meal and the End of An Era."

FISHERY JURISDICTION: Sen. Magnuson spoke in the Senate (Congressional Record, May 19, 1966, pp. 10501-10506), of his overall concern for the conservation of world fishery resources. He inserted in the Record an editorial from an issue of the British fishery trade publication Fishing News International, titled "Fishing Limits and the Roaming Fisherman." The editorial compared some of the problems of the Pacific Coast of the United States with those of South Africa. In summation, Senator Magnuson stated that the United States must take world leadership in assembling the coastal and fishing nations to determine the proper conservation regime.

FISHING LIMIT OF 12 MILES: Introduced in House H.R. 15030 (St. Germain) May 12, and H.R. 15191 (Rogers) May 23, 1966, to establish a contiguous fisheries zone beyond the territorial sea of the United States; to Committee on Merchant Marine and Fisheries. Rep. St. Germain in extension of his remarks (Congressional Record, May 12, 1966, p. 10016), stated this legislation will serve to protect our fishermen from foreign fishermen operating in our coastal waters; enhance our fishermen to extend their operations and further develop the fishing industry as a whole; and, enable us to exercise conservative measures in the highly productive coastal waters.

The Subcommittee on Merchant Marine and Fisheries of Senate Committee on Commerce held hearings May 18, 1966, on S. 2218. Having as witnesses Clarence Pautzke, Deputy Assistant Secretary of the Interior for Fish and Wildlife and Parks, and others.

Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries held hearings May 24 and 25 on H.R. 9531 and H.R. 14961.

Subcommittee on Merchant Marine and Fisheries of Senate Committee on Commerce May 20, 1966, continued its hearings on S. 2218. Testimony was heard from public witnesses, and the hearings were recessed subject to call.

Rep. Rogers spoke in the House (Congressional Record, May 23, 1966, p. 10589) and stated that estimates of the Department of the Interior show that with more emphasis and incentives the American fishing industry could take 5 to 6 times more fish than are presently being taken by U.S. fishermen, who have slipped to the point of catching less than half of the U.S. catch of 20 years ago. He further stated that of this increase, 65 percent could come from fish taken 12 miles off the U.S. shoreline and if American fishermen do not take them foreign interests will. Stated our national interests demand that legislation be enacted to extend the U.S. limits to 12 miles.

Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries held a hearing on H.R. 9531, and related bills, H.R. 9530, and H.R. 14961. Among others testimony was heard from Frank J. Barry, Solicitor, Department of the Interior. Hearings were continued on June 1. Testimony was heard from witnesses of the Department of the Interior.

Senate Committee on Commerce, June 7, 1966, in executive session, ordered favorably reported with amendments S. 2218.

FISH PROTEIN CONCENTRATE PLANTS: Senate received May 12, 1966, a joint resolution of the Legislature of the State of California memorializing the Congress to enact legislation at the earliest possible date to authorize construction of experimental fish protein concentrate plants.

Senate Committee on Commerce held hearings May 16, 1966, on S. 2720, to authorize development of a practical means for production of fish protein concentrate. Hearings continued.

H.R. 15099 (Hathaway) introduced in House May 17, 1966, to Committee on Merchant Marine and Fisheries.

Sen. Bartlett inserted in Congressional Record, June 1, 1966 (pp. 11394-11397), a speech given by Sen. Magnuson on Apr. 25, in Aberdeen, Wash., at hearings conducted on S. 2720.

FOREIGN FISHING OFF U.S. COAST: Sen. Magnuson spoke in the Senate (Congressional Record, May 16, 1966, pp. 10166-10169) and stated there is growing concern over the threat to national security posed by Soviet fishing fleets off our coasts and inserted in the Record the text of a number of telegrams he received from citizens of Washington expressing such concern. He planned to have Navy witnesses appear at hearings on S. 2218, a bill to establish a contiguous fishery zone beyond the territorial sea of the United States, so as to ascertain the correctness of quotations which appeared in the March 1966 Navy magazine which told of Soviet Union trawlers placing homing devices on our Continental Shelf seabed. He presented a program of 11 principles as a method of achievement toward national security and fishery protection.

Sen. Morse inserted in Congressional Record, May 16, 1966 (pp. 10169-10171), the text of a letter from the State Department dated May 9, in answer to his letter of Apr. 25, on the subject. Also inserted text of a letter on the subject from the Director, Bureau of Commercial Fisheries, dated May 2, 1966, in reply to his letter of Apr. 25.

Rep. Rogers spoke in the Senate (Congressional Record, May 18, 1966 (pp. 10377-10378), and expressed his concern about Russian oceanographic vessels operating in waters near the coast of Florida. He urged the Defense Department to give higher priority to this Nation's efforts to win the "wet space race."

Sen. Magnuson spoke in the Senate (Congressional Record, May 19, 1966, p. 10509), concerning statements made on the Senate floor on the danger of "homing devices" which a Navy magazine article charged were found by the U.S. Navy on our Continental Shelf which according to the author were placed there by the Soviet trawl fleet. He inserted the text of a resolution he received from the King County Television Service Association, Inc., expressing deep concern as to the potential dangers of such devices.

Rep. Keith in extension of his remarks inserted in Congressional Record, May 25, 1966 (p. A2838), an article from the May 21, 1966, edition of the Boston Herald titled "United States to Seek An End To Red Overfishing" by Paul Giguere.

Sen. Magnuson inserted in Congressional Record, May 27, 1966 (pp. 11212-11215), an affidavit concerning the taking of salmon by foreign fishing vessels off the Washington and Oregon coasts. He stated that the U. S. should declare an immediate conservation moratorium on foreign fishing on the stocks of salmon and Pacific hake until such time as the conservation requirements of those stocks can be determined.

Senate June 6, 1966, received a joint resolution from the Legislature of the State of California memorializing Congress to take the necessary action to ensure adequate protection to the marine resources of California, to step up the program to monitor the activities of Soviet vessels off the Pacific Coast, and to keep the State fully informed of such activities. The resolution was referred to Committee on Commerce.

Sen. Jackson inserted in Congressional Record, June 1, 1966 (pp. 11461-11463), an article from the May 28, 1966, issue of the Everett Herald titled "Russ Roulett: Fishing at Stake" by Alan Dawson, Jr. and an article from the May 1966 issue of the Pacific Fisherman titled "Big Soviet Bottomfish Fleet Fishes Off Coast of Washington and Oregon."

FUR SEAL CONSERVATION AND PRIBILOF ISLANDS ADMINISTRATION: The Senate Committee on Commerce, May 17, 1966, in executive session, ordered reported favorably with an amendment in the nature of a substitute, S. 2102, a bill to protect and conserve the North Pacific fur seals, and to administer the Pribilof Islands for the conservation of fur seals and other wildlife. On June 9, 1966, the Committee reported the bill S. Rept. 1235.

GREEK-TURKISH ECONOMIC REPORT--FISHERIES: Sen. Javits inserted in Congressional Record, June 1, 1966 (pp. 11373-11376), a report he submitted to the Special Committee on Less Developed NATO Countries on May 12, 1966, concerning status of the project for Greek-Turkish economic cooperation. Fisheries was one of the projects listed in the report.

INTERIOR APPROPRIATIONS FY 1967: Senate May 12, 1966, passed (motion to reconsider tabled) H.R. 14215, fiscal 1967 appropriations for the Department of the Interior and related agencies, after adopting committee amendments en bloc which were then considered as original text for purpose of further amendment; and a technical perfecting amendment by Senator Bible respecting fisheries conservation. Senate insisted on its amendments, asked for conference with House, and appointed conferees.

House May 16, 1966, disagreed to Senate amendments to H.R. 14215, agreed to a conference with the Senate, and appointed conferees.

The Committee on Conference filed a conference report on H.R. 14215 (H. Rept. 1538). Text of the report is printed in Congressional Record, May 17, 1966 (pp. 10314-10316), together with a statement by the managers on the part of the House. The Committee on Conference's recommendations on the Senate amendments which pertain to the Bureau of Commercial Fisheries:

Amendment No. 18. Appropriates $20,701,000 for management and investigations of resources instead of $20,312,000 as proposed by the House and $21,076,000 as proposed by the Senate. The increase over the House bill includes: $90,000 for tail water research and expansion of biological investigation, disappearance of migrating fish, upper reaches of the Columbia River Basin; and $50,000 for expanded development of the Pacific Hake Fishery program.

Amendment No. 19. Appropriates $2,675,000 for Anadromous and Great Lakes fisheries conservation as proposed by the Senate, and deletes language "To remain available until expended."

House May 18, 1966, adopted the conference report on H. R. 14215. A summary tabulation of the action taken on the various items in the bill was inserted in the Record (p. 10379).

Senate May 19, 1966, adopted the conference report on H. R. 14215, thus clearing the bill for the President's signature. A tabulation was inserted in the Record setting out the appropriation for the current year, the budget estimate, the House allowance, the Senate allowance and the conference allowance for each appropriation in the bill.

H. Rept. 1538, Department of the Interior and Related Agencies Appropriations, 1967 (May 17, 1966, reported from the Committee of Conference, U. S. House of Representatives, 89th Congress , 2nd session, to accompany H. R. 14215), 11 pp., printed. Committee recommended that the Senate recede from certain amendments and that the House recede from its disagreements to other amendments of the Senate. Some of the amendments concerned funds of the two Bureaus of the Fish and Wildlife Service: Commercial Fisheries and Sport Fisheries and Wildlife.

S. Rept. 1154, Interior Department and Related Agencies Appropriation Bill, 1967 (May 10, 1966, report from the Committee on Appropriations, U. S. Senate, 89th Congress, 2nd session, to accompany H. R. 14215), 50 pp., printed. Committee submitted report in explanation of the bill (includes the U. S. Fish and Wildlife Service and its two Bureaus: Commercial Fisheries and Sport Fisheries and Wildlife) for fiscal year 1967.

Fish and Wildlife Service Appropriations for Fiscal Year 1967: Budget Estimate, the House Allowance, the Senate Allowance, and the Conference Allowance.

Item	Approp. FY 1966	Budget Est. 1967	House Allow.	Senate Allow.	Conf. Allow.
FISH AND WILDLIFE SERVICE					
OFFICE OF THE COMMISSIONER OF FISH AND WILDLIFE					
Salaries and expenses	452,500	-	-	-	-
BUREAU OF COMMERCIAL FISHERIES					
Mgt. and invest. of resources	27,072,800	20,092,000	20,312,000	21,076,000	20,701,000
Mgt. and invest. of resources (appropriation of receipts)	-	(1,000,000)	(1,000,000)	(1,000,000)	(1,000,000)
Mgt. and invest. of resources (spec. for. currency program)	300,000	200,000	500,000	500,000	500,000
Construction	1,980,000	495,000	1,245,000	1,245,000	1,245,100
Construction of fishing vessels	5,000,000	3,300,000	3,000,000	3,000,000	3,000,000
Fed. aid for commercial fisheries research and development	4,713,200	3,210,000	4,710,000	4,710,000	4,710,000
Anadromous & Great Lakes Fisheries Conservation	-	-	-	2,675,000	2,675,000
Gen. administrative expenses	689,000	739,000	739,000	739,000	739,000
Administration of Pribilof Islands (indefinite appropriation of receipts)	(2,464,000)	(2,468,000)	(2,468,000)	(2,468,000)	(2,468,000)
Limitation on administrative expenses, fisheries loan fund	(309,000)	(309,000)	(309,000)	(309,000)	(309,000)
Total, Bureau of Commercial Fisheries	34,755,000	28,036,000	30,506,000	33,945,000	33,570,000
BUREAU OF SPORT FISHERIES AND WILDLIFE					
Mgt. & invest. of resources	36,792,300	37,304,000	37,164,000	39,161,400	38,145,800
Construction	18,299,200	3,169,000	5,130,000	8,341,600	7,118,600
Migratory bird conservation account	7,500,000	6,000,000	6,000,000	6,000,000	6,000,000
Appalachian region fish and wildlife restoration projects	-	1,350,000	1,000,000	500,000	500,000
Anadromous & Great Lakes Fisheries Conservation	-	-	-	2,675,000	2,675,000
Gen. administrative expenses	1,492,300	1,564,000	1,549,000	1,564,000	1,549,000
Total, Bureau of Sport Fisheries and Wildlife	64,083,800	49,387,000	50,843,000	58,242,000	55,988,400
Total, Fish and Wildlife Service	99,291,300	77,423,000	81,349,000	92,187,000	89,558,400

Department of the Interior and Related Agencies Appropriations for Fiscal Year 1967: Hearings before a Subcommittee of the Committee on Appropriations, United States Senate, Eighty-Ninth Congress, 2nd session on H. R. 14215, Part 1 (pages 1 through 1099) (Thurs., Feb. 17, 1966, through Mar. 3, 1966) and Part 2 (pages 1101 to end) (Friday, Mar. 4, 1966, through Wed., Mar. 16, 1966), 2288 pp., printed. Included are testimony, statements and exhibits relating to funds for the Fish and Wildlife Service, and its two Bureaus, Commercial Fisheries and Sport Fisheries and Wildlife.

On May 31, 1966, the President signed into law, H. R. 14215 (Public Law 89-435).

MINIMUM WAGE: House May 26, 1966, passed H. R. 13712, to amend the Fair Labor Standards Act of 1938 to extend its protection to additional employees, to raise the minimum wage, and for other purposes. House re-

jected an amendment offered by Rep. Downing (Congressional Record, May 26, 1966, pp. 11046-11094) which would exempt the shellfish industry from the provisions of the minimum wage law. He stated that application of the minimum wage to the shellfish industry in 1961 has forced the industry into a severe economic crisis. Many shellfish businesses have had to close down over the past 5 years because they were unable to pay the statutory costs; and serious unemployment has resulted throughout the industry because so many firms have been forced to lay off employees. Same day Rep. Lennon spoke in the House in support of this amendment.

House passed-bill H. R. 13712, was referred May 27, 1966, to Senate Committee on Labor and Public Welfare.

Subcommittee on Labor of Senate Committee on Labor of Senate Committee on Labor and Public Welfare, June 8, 1966, met in executive session to consider H. R. 13712.

NATIONAL SEA GRANT COLLEGES AND PROGRAM ACT OF 1965: Introduced in House H. R. 15052 (Bates) and H. R. 15061 (O'Hara of Ill.) May 16; H. R. 15261 (Fascell) and H. R. 15290 (Grover) May 26, 1966, to amend the National Science Foundation of 1950, as amended, so as to authorize the establishment and operation of sea-grant colleges and programs by initiating and supporting programs of education, training, and research in the marine sciences and a program of advisory services relating to activities in the marine sciences, to facilitate the use of submerged lands of the Outer Continental Shelf by participants carrying out these programs, and for other purposes; to Committee on Science and Astronautics.

Special Subcommittee on Sea Grant College of Senate Committee on Labor and Public Welfare May 19, 1966, met in executive session to consider S. 2439, but did not conclude action thereon, and recessed subject to call.

Rep. Fascell spoke in the House (Congressional Record, May 25, 1966, p. 10863) and stated that this bill supplements the oceanography bill, S. 944, by providing the trained manpower required to tackle the practical problems before us in oceanography. It will support educational and research programs in the marine sciences; encourage and develop a viable transfer of information; facilitate use of submerged lands of the Outer Continental Shelf; and finally encourage and facilitate development of regional centers of excellence in the various fields of marine sciences. At one point Rep. Fascell stated that under the sea grant college bill, we will be more capable of coping with the problems confronting industry, especially fishing and shipping.

Special Subcommittee of House Committee on Labor and Public Welfare June 1, 1966, met in executive session, approved for full committee consideration with amendments S. 2439.

Sen. Bartlett spoke in the Senate (Congressional Record, June 9, 1966, p. 12139), endorsing S. 2439. He stated that this bill provides us with a meaningful system whereby the benefits of our learning can be transferred to the fishing and resource development industries.

NATIONAL WATER COMMISSION: Senate Committee on Interior and Insular Affairs May 16, 1966, began hearings on S. 3107, establishing a National Water Commission to review national water resource problems, with testimony from Stewart L. Udall, Secretary of the Interior. Hearings continued May 17, 1966, recessed subject to call.

H. R. 15110 (Foley) introduced in House May 17, 1966, to Committee on Interior and Insular Affairs.

Committee on Interior and Insular Affairs June 8, 1966, reported (S. Rept. 1212), with amendments, S. 3107.

Senate June 9, 1966, passed, with amendments S. 3107.

OCEANOGRAPHIC AGENCY OR COUNCIL: Rep. Rogers spoke in the House (Congressional Record, May 19, 1966, p. 10560), and stated that a high level U. N. Commission has urged that the United Nations assert ownership over the high seas and sea floor as a means of independent income for the organization. He stated that the United States must assert its leadership to see that the question of title to the high seas is resolved in such a way as to protect our own sovereignty, and encourage the development of ocean exploration. He also stated that the conference report will be available shortly on S. 944, the proposed Marine Resource and Engineering Development Act, and that he is hopeful that once the bill is enacted, the Presidential Commission on Oceanography will begin an immediate examination on the legal aspects of ownership of materials gained from high sea and undersea exploration.

Committee on Conference May 24, 1966, reported the conference (H. Rept. 1548) on S. 944, the proposed Marine Resources and Engineering Development Act of 1966. The text of the report is printed in Congressional Record, May 24, 1966 (pp. 10728-10731). The Conference Committee in effect recommended a bill which contains a declaration of policy and objectives as contained in the House version of S. 944; which provides for a Cabinet-level Council with the Vice President as Chairman as contained in the Senate version except that the provisions of the Act concerning the Council shall expire 120 days after the submission of the report by the Commission; and which provides for a self-liquidating Commission on Marine Science, Engineering, and Resources. The Commission is to have 15 members with 4 additional advisory members appointed by the President from the Senate and House. The Commission is to report to the President via the Council, and to the Congress, not later than 18 months after its creation and shall cease to exist 30 days after submission of its report.

House May 26, 1966, adopted the conference report on S. 944.

H. Rept. 1548, Marine Resources and Engineering Development Act of 1966 (May 24, 1966, report from the Committee of Conference, House of Representatives, 89th Congress, 2nd session, to accompany S. 944), 9 pp., printed. Committee recommended that Senate recede from its disagreement to the amendment of the House and agree to same with an amendment. Discusses declaration of policy and objectives.

Senate June 2, 1966, adopted conference report on and cleared for President S. 944. Supporting remarks and statements from others inserted in Record.

Rep. Reinecke in extension of remarks (Congressional Record, June 6, 1966, pp. A3039-A3040) summarizing the provisions of S. 944, pointed out that enactment of

S. 944, would provide the national marine science program with a legislative base, a legislative commitment of policy and purpose, and a statutory body to plan, evaluate, and coordinate such a program.

OCEANOGRAPHY: Senate May 19, 1966, received a communication from the President of the United States, transmitting the National Oceanographic Program for fiscal year 1967 (with accompanying report); referred to Committee on Commerce.

Resolution was received in the Senate May 19, 1966, which was adopted by the 75th Continental Congress, National Society, Daughters of the American Revolution, Apr. 18-22, 1966. The resolution commended the Congress, industry and scientific institutions for the development in this field and encouraged even more concerted effort to train the scientists and technicians necessary for the expansion of an educational program of oceanography, marine mining, aqua culture and related fields; referred to Committee on Armed Services.

Sen. Magnuson inserted in Congressional Record, May 23, 1966 (pp. 10647-10648), an address given May 11 by Rear Adm. Odale D. Waters, Jr., Oceanographer of the Navy, before the Third Military Oceanography Symposium in San Diego, titled "Navy Oceanography--What and Why." In his address, Admiral Waters predicted tighter direction of spending, and greater orientation toward the production of practical results in the Government-supported oceanographic program, citing the importance of fisheries and ocean mining capabilities along with expansion of military capability.

In extension of his remarks Rep. Rogers inserted in Congressional Record, May 31, 1966 (pp. A2947-A2949), a speech delivered by Sec. of the Navy Hon. Paul H. Nitze, before the annual National Convention of the Navy League on May 27, 1966. Sec. Nitze's remarks concerned the future of oceanography.

OYSTER PLANTERS LOAN: H. R. 15389 (McGrath) introduced in House June 1, 1966, to extend the benefits of the Consolidated Farmers Home Administration Act to oyster planters; to Committee on Agriculture.

RESEARCH CONTRACTS: Introduced in House H. R. 15316 (Aspinall) May 26, and in the Senate, S. 3460 (Jackson) June 6, 1966, to authorize the Secretary of the Interior to enter into contracts for scientific and technological research, and for other purposes; to Committee on Interior and Insular Affairs.

SEA GRANT COLLEGES: Introduced in House, H. R. 15192 (Rogers of Fla.) May 23, H. R. 15471 (Lennon) June 6, and H. R. 15569 (Garmatz) June 8, 1966, to amend title II of the Merchant Marine Act, 1936, to authorize the establishment and operation of sea grant colleges and certain education, training, and research programs; to Committee on Merchant Marine and Fisheries.

Rep. Rogers inserted in Congressional Record, May 27, 1966 (pp. A2914-A2915), an editorial which appeared in the May 6, 1966, issue Palm Beach Post titled "Sea Grant Colleges." Among other things, the editorial covered the Florida Atlantic University's unique program of ocean engineering--the first undergraduate ocean engineering program in the free world.

Speaking in the House Rep. Garmatz pointed out in Congressional Record, June 8, 1966 (pp. 12013-12014), that this legislation will encourage this Nation's scientific, industrial, and educational facilities to accelerate their involvement in marine technology. He stated that the United States and the Soviet Union are competing for mastery of the seas and that a program of sea grant colleges must be initiated to correct any imbalances in America's ranks of marine scientists and technicians.

The Subcommittee on Oceanography of House Committee on Merchant Marine and Fisheries held hearings June 17, 1966, on H. R. 15192, H. R. 15471, and H. R. 15569.

SUPPLEMENTAL APPROPRIATIONS FY 1966 (2nd): H. Rept. 1476, Second Supplemental Appropriation Bill, 1966 (May 5, 1966, report from the Committee of Conference, House of Representatives, 89th Congress, 2nd session, to accompany H. R. 14012), 6 pp., printed. Committee reported bill favorably with amendments.

On May 13, 1966, the President signed into law H. R. 14012 (P. L. 89-426).

TERRITORIAL SEA AND CONTIGUOUS ZONE CONVENTION: Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries have scheduled hearings for May 24 and 25 on H. R. 9530, to protect fishery and other resources by implementing the Convention on the Territorial Sea and the Contiguous Zone.

TERRITORIAL WATERS EXTENSION: H. R. 15278 (St. Germain) introduced in House May 25, 1966, to extend the area within which certain foreign vessels (and the masters thereof) are prohibited from fishing; and to make domestic conservation laws applicable to foreign vessels (and masters thereof) fishing above the Continental Shelf, to the same extent that such laws are applicable to U. S. vessels; to Committee on Merchant Marine and Fisheries. Rep. St. Germain spoke in the House (Congressional Record, May 25, 1966, pp. 10905-10906), and stated that in addition to the establishment of a 9-mile fisheries zone - extending from our 3-mile territorial sea - it is necessary that we establish a conservation zone contiguous to the 9-mile fisheries zone and extending over the Continental Shelf, or to a depth of 200 meters. Thus, all foreign fishermen operating in our coastal waters within the 100 fathom line will be subjected to the same conservation measures as are our own fishermen. This legislation will enable us to: first, effectively control fishing within our coastal waters; second, enhance rather than impair the efforts of our fishermen to expand their catch; third, take proper conservative action to insure that our future demands for fish are met; and fourth, will ultimately allow us to take our proper place in the world fish industry.

TRADE AGREEMENT: Sen. Douglas inserted in Congressional Record, June 6, 1966 (pp. 11770-11772), the text of a letter he received from Christian Herter, Special Representative of the President for Trade Negotiations, expressing the views of his office on the American selling price (ASP) system as it relates to the Kennedy Round of trade negotiations in Geneva.

TRADE EXPANSION ACT AMENDMENT (GATT): Rep. Curtis, member of the Congressional delegation, inserted in Congressional Record, May 31, 1966 (pp. 11280-11293), a report on the sixth Kennedy Round of Trade Negotiations under the General Agreement on Tariffs and Trade. The report reviews some of the ma-

jor problems of the present negotiations. He stated that the problem of fisheries in international trade will be discussed in a second section to this report.

U. S. VESSELS FISHING OFF FOREIGN COASTS: Sen. Kuchel spoke in the Senate (Congressional Record, May 24, 1966, pp. 10686-10687), and stated it should be made abundantly clear that the United States will bar further assistance to nations which hinder operation of U. S. fishing vessels on the high seas.

Rep. Wilson inserted in Congressional Record, May 25, 1966 (p. 10881), an editorial which appeared in the May 22, 1966, edition of the San Diego Union concerning U. S. fishing in foreign territorial waters.

H. R. 15378 (Wilson) introduced in House May 31, 1966, to amend the Foreign Assistance Act of 1961 to provide for a method of reimbursing owners of certain fishing vessels which are subjected to harassment by officials of countries of South and Central America; to Committee on Foreign Affairs.

VESSEL MEASUREMENT: House Committee on Merchant Marine and Fisheries June 7, 1966, reported (H. Rept. 1618) on S. 2142, to simplify the admeasurement of small vessels; without amendment; referred to Committee of the Whole House on the State of the Union.

WATER POLLUTION CONTROL: H. R. 15106 (Stalbaum) introduced in House May 17, 1966, to amend the Federal Water Pollution Control Act in order to improve the programs under such act; to Committee on Public Works.

In extension of his remarks Rep. King inserted in Congressional Record, June 1, 1966 (pp. A2962-A2963), a recent editorial from the Salt Lake Tribune titled "Now To Get Clean Water Program in Gear." The article outlines moves that have been taken since the responsibilities for water pollution control were shifted from HEW to the Interior Department.

WATER RESOURCE PROPOSALS--FEASIBILITY INVESTIGATIONS: Subcommittee on Irrigation and Reclamation of House Committee on Interior and Insular Affairs May 19, 1966, met in executive session and considered H. R. 13419, to authorize the Secretary of the Interior to engage in feasibility investigations of certain water resource development proposals. No final action was taken.

Subcommittee on Irrigation and Reclamation of House Committee on Interior and Insular Affairs met May 31, 1966, in executive session and approved for full committee action H. R. 13419 (amended).

House Committee on Interior and Insular Affairs June 8, 1966, met in open session and considered H. R. 13419. No final action was taken.

WORLD HUNGER ACT: (H. R. 14929, 14939, 14945). In these bills, which were introduced on May 9, 1966, it is to be noted that the definition of "agricultural commodity" reads: ". . . to include any product of an agricultural commodity. Subject to the availability of appropriations therefor, any domestically produced fishery product (not including fish concentrate until approved by the Food and Drug Administration) may be made available under this." In the old version of the bill, H. R. 12785, the term "agricultural commodity" was used only to include any product of an agricultural commodity.

House Committee on Agriculture May 18, 1966, met in executive session and ordered reported favorably to the House H. R. 14929 (amended).

Rep. Harvey inserted in Congressional Record, May 25, 1966 (pp. 10879-10880), an article from the Christian Science Monitor of May 25, 1966, titled "Strategy Strings Assailed in Food-For-Freedom Program."

House May 27, 1966, reported (H. Rept. 1558) with amendments H. R. 14929, the proposed Food-for-Freedom Act of 1966.

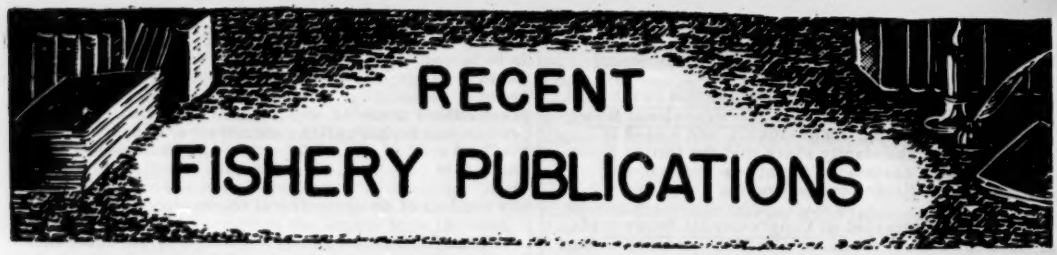
H. Rept. 1558, The Food-For-Freedom Act of 1966 (May 27, 1966), report from the Committee on Agriculture, House of Representatives, 89th Congress, 2nd session, to accompany H. R. 14929), 109 pp., printed. Committee reported bill favorably with amendments. Discusses purposes and major provisions of the bill.

House Committee on Rules June 2, 1966, reported H. J. Res. 878, a resolution providing for the consideration of, 4 hours of debate on, and waiving points of order against H. R. 14929 (H. Rept. 1603).

House June 8, 1966, adopted H. Res. 878, a resolution providing for the consideration of H. R. 14929, the proposed Food-For-Freedom Act of 1966. During consideration of the bill, Rep. Cooley inserted in Congressional Record, June 8, 1966 (pp. 11976-11988), a brief summary and explanation of the bill. Rep. Rhodes inserted in the Record the policy statement regarding H. R. 14929 which was adopted by the Republican Policy Committee on June 7, 1966. House concluded all general debate on the bill, and it will be open for amendments on Thursday, June 9.

House June 9, 1966, passed, with amendments, H. R. 14929. The House adopted the amendment offered by Rep. Pike, which would allow fish concentrate to be included in the bill without the existing stipulation that it first must be approved by the Food and Drug Administration.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS: The U. S. Department of the Interior's Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL-3 - "Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, Bureau of Commercial Fisheries, 1815 N. Fort Myer Drive, Rm. 510, Arlington, Va. 22209.



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CFS-4113 - Shrimp Landings, 1965 Annual Summary, 17 pp.
CFS-4114 - Fish Meal and Oil, March 1966, 2 pp.
CFS-4118 - Mississippi Landings, February 1966, 2 pp.
CFS-4121 - South Carolina Landings, March 1966, 2 pp.

Sep. No. 764 - Experimental Fish Trawling Survey Along the Florida West Coast.

FL-590 - List of Fishery Associations in the United States, by Leslie D. McMullin, 10 pp., May 1966.

FL-584 - Marine Protein Concentrate, 32 pp., April 1966. Contains a summary report on the development of a commercial manufacturing process to convert red hake into a high-quality marine protein concentrate for human consumption. Plans, as well as estimates of processing and product costs, are shown. Data are presented on the physical, chemical, nutritional, bacteriological, and toxicological studies on marine protein concentrate.

An Economic Study of the Boston Large-Trawler Labor Force, by Virgil J. Norton and Morton M. Miller, Circular 248, 57 pp., illus., printed, May 1966. The report focuses on the socio-economic characteristics of the Boston offshore trawler labor force covering the age; national origin; education and training; fishing and non-fishing job experience; unemployment, illness and injury rates and earnings of fishermen in the Boston offshore labor force.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE BUREAU OF COMMERCIAL FISHERIES, U. S. DEPARTMENT OF THE INTERIOR, 101 SEASIDE AVE., TERMINAL ISLAND, CALIF. 90731.

"Finance and insurance," Chapter VIII, pp. 539-560, Translation No. 18, 33 pp., processed, April 1966.

"Marketing," Chapter IX, pp. 596-600, Translation No. 19, 2 pp., processed, April 1966.

(Both are translations from the Japanese Comprehensive View of the (Japanese) Tuna Fishery, by Shoichi Masuda, 844 pp., published by Suisansha, 8 Banchi, Sanei-cho, Shinjuku-ku, Tokyo, Japan, March 1963.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, April 1966, 14 pp. (Market News Service, U.S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, sardines, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, April 1966, 8 pp., and Supplement, 1 p. illus. (U. S. Bureau of Commercial Fisheries, Biological Laboratory, P. O. Box 6121, Pt. Loma Station, San Diego, Calif. 92106.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Middle Atlantic Fishery Trends--Monthly Summary--February and March 1966, 20 and 18 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, April 1966, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, March 1966, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade, 1965 (Includes Statistics and Marketing Trends), 37 pp., illus. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013). The first part of this annual summary discusses fishery products receipts, prices, and imports; fish meal, oil, and solubles prices; highlights of the 1965 season; shrimp supplies, prices, and imports; and canned tuna prices in the salt-water section of New York's wholesale Fulton Fish Market. The second section covers receipts, prices, and trends in the fresh-water fish market (Peck Slip Area). The final section contains statistical tables giving receipts of fresh and frozen fish and shellfish by species, states and provinces, and transport methods, 1964-65; landings and ex-vessel prices at Fulton Market; imports through New York Customs District; frozen fishery products by months; and monthly shrimp imports by country.

Oceanographic Observations, 1963, East Coast of the United States, by Joseph Chase, Data Report 10, 3 microfiche cards, illus., distribution limited. (Branch of Reports, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington, D. C. 20240.)

Production of Fishery Products in Selected Areas of Maryland, Virginia, and North Carolina, 1965, Preliminary, by William N. Kelly, 20 pp., June 1966. (Market News Service, U. S. Fish and Wildlife Service, P. O. Box 447, Hampton, Va. 23369.) A summary of commercial landings of fish and shellfish and the production of crab meat and shucked oysters as reported by producers and wholesalers from selected principal fishing localities of Virginia, Maryland, and North Carolina. Discusses landings in the Hampton Roads, Lower Northern Neck, Lower Eastern Shore, and Chincoteague areas of Virginia; Ocean City, Cambridge, and Crisfield, Maryland; and Morehead City, North Carolina. The statistics in this summary represent partial commercial fisheries production only and do not represent complete commercial landings or production for a given area, individual state, or the Chesapeake Bay Area as a whole. However, the statistics do show trends in fisheries production for the specific area designated and do reflect the over-all production trend by species, localities, and states.

Releases and Recoveries of Marked Pink Shrimp, PENAEUS DUORARUM Burkenroad, in South Florida Waters, 1958-1964, by Donald M. Allen and T. J. Costello, Data Report 11, 3 microfiche cards, illus., distribution limited. (Branch of Reports, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington, D. C. 20240.)

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, April 1966, 8 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 New Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes landings by the halibut fleet reported by the Seattle Halibut Exchange; salmon fleets reported by primary receivers; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district for the month indicated.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERIVCE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALASKA:

Test Fishing in Bristol Bay, 1960-64, by Melvin C. Seibel, Informational Leaflet 67, 39 pp., processed, Aug. 12, 1965. Alaska Department of Fish and Game, Subport Bldg., Juneau, Alaska 99801.

ALEWIVES:

"Composition of combustible concretions of the alewife, Alosa pseudoharengus," by Ernest Sondheimer and others, article, Science, vol. 152, no. 3719, Apr. 8, 1966, pp. 221-223, illus., printed, single copy 35 cents. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

ALGAE:

"The occurrence and assay of isocitrate lyase in algae," by W. Geoffrey Haigh and Harry Beevers, article, Archives of Biochemistry and Biophysics, vol. 107, July 1964, pp. 147-151, printed. Academic Press, Inc., 111 Fifth Ave., New York, N. Y. 10003.

ANCHOVIES:

"Block-freezing of Caspian Sea anchovies arranged in rows," by E. F. Krivorotov, article, Rybnoe Khozjaistvo, no. 6, 1965, pp. 69-71, illus., printed in Rus-

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

sian. Institute of Marine Fisheries & Oceanography, 17 V. Krasnosseleskja, Moscow, U.S.S.R.

ARGENTINA:
Analisis (Fisheries Special Edition, titled "Nuestro mar ancho y ajeno"--Our wide and unknown sea), 90 pp., illus., printed in Spanish, March 1966, M$N 1.78 (US$1.00). Analisis Sociedad Anomina, Bartolomé Mitre 226, Buenos Aires, Argentina. This Argentine weekly's special edition describes and reviews the current situation in the country's fishing industry. Includes articles on Government relationships and support; status of industry development; the fleet; the fishery export situation; prospects for the industry; fishery meetings; integration of the fillet industry; technical needs of the industry; and interviews with the President of the Banco Industrial (which has established a system of credits for the industry), the President of the Mar del Plata Chamber of the Fishing Industry, and the vice president of the Argentine Chamber of Fishmeal Industries.

ARTIFICIAL REEFS:
Artificial Reefs--A Review, by Iris Unger, Special Publication No. 4, 74 pp., illus., printed, 1966, $1.00. American Littoral Society, Sandy Hook Marine Laboratory, Highlands, N. J. 07732.

BACTERIOLOGY:
"Bacteriological survey of filleting processes in the Pacific Northwest. IV--Bacterial counts of fish fillets and equipment," by Wayne I. Tretsven, article, Journal of Milk and Food Technology, vol. 28, Sept. 1965, pp. 287-291, printed. Journal of Milk and Food Technology, P. O. Box 437, Shelbyville, Ind. 46377.

BIOCHEMISTRY:
"Microelectrophoretic separation on starch gel of the hemoglobins of Salmo salar," by H. J. A. Koch, Eva Bergstrom, and J. C. Evans, article, Chemical Abstracts, vol. 63, Nov. 22, 1965, Abstract No. 15208c, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

BLOOD OF FISH:
Papers available from the American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005, by Charles W. Caillouet, processed, 1965:

Changes in Blood Lactic Acid in Mature Bullheads After Live Transportation (Presented at Annual Meeting, Southern Division, American Fisheries Society, Tulsa, Okla.), 8 pp.

Nature of Variability on Blood Lactic Acid Data from Fishes (Presented at the 95th Annual Meeting, American Fisheries Society, Portland, Oreg.), 11 pp.

BOATING:
Recreational Boating Statistics, 1965, CG-357, 44 pp., illus., processed, 1966. Commandant (ORB), U.S. Coast Guard Headquarters, Washington, D. C. 20226.

BOTULISM:
Botulism and Fishery Products, by J. M. Shewan and D. C. Cann, Torry Advisory Note no. 22, 7 pp., printed, 1965. Torry Research Station, Ministry of Technology, 135 Abbey Road, Aberdeen, Scotland.

This Note explains the cause of botulism, describes how outbreaks abroad have happened, and gives advice to producer and consumer on how the hazard can be averted.

BRAZIL:
Following articles available from Estaçao de Biologia Marinha, Universidade do Ceará, Av. Antônio Justa, 3207, Caixa Postal, 1072, Fortaleza, Ceará, Brazil:

"Bibliografia sôbre os recursos marinhos do Brasil" (Bibliography on marine resources of Brazil), by Hitoshi Nomura, article, Boletim da Estação de Biologia Marinha da Universidade do Ceará, no. 7, 1965, 53 pp., printed in Portuguese.

"Length-weight tables of some fish species from Northeastern Brazil," by Hitoshi Nomura, article, Arq. Est. Biol. Mar. Univ. Ceará, vol. 5, no. 2, December 1965, pp. 103-105, printed in English and Portuguese.

CALIFORNIA:
California Fish and Game, vol. 52, no. 2, April 1966, pp. 67-128, illus., printed, single copy $0.75. Department of Fish and Game, The Resources Agency, Sacramento, Calif. (Sold by Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.) Includes articles on: "Annotated list of fishes collected by midwater trawl in the Gulf of California, March-April 1964," by Robert J. Lavenberg and John E. Fitch, pp. 92-110; "Fecundity of the Pacific hake Merluccius productus (Ayres), by John S. Macgregor, pp. 111-116; "Sea lion census for 1965 including counts of other California pinnipeds," pp. 119-120.

CANADA:
"Experts make joint study of vessels, gear, techniques," by James Kinloch, article, Trade News, vol. 18, no. 9, March 1966, pp. 3-13, illus., printed. Director of Information and Educational Service, Department of Fisheries, Ottawa 8, Canada.

Issued by Industry Division, Dominion Bureau of Statistics, Ottawa, Canada. (Sold by Queen's Printer and Controller of Stationery, Ottawa.):

Fisheries Statistics of Canada, 1963, Catalogue No. 24-201, 59 pp., printed in French and English, April 1966, C$0.75. This report provides a summary of the Canadian fisheries and the information is arranged to show separately the three main fisheries areas i.e., Atlantic, Pacific, and Inland. A glossary is furnished of the accepted common names of the kinds of aquatic animals and plants included in this publication and also the scientific names and English synonyms. The statistics (shown in 16 tables) show value of products for selected species; landings, quantity, and value by specific species; etc.

Fisheries Statistics, Nova Scotia, 1964, Catalogue No. 24-205, 41 pp., illus., printed in French and English, April 1966, C$0.75.

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Journal of the Fisheries Research Board of Canada, illus., printed; issued by Fisheries Research Board of Canada, Ottawa, Canada. (Sold by Queen's Printer,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Ottawa.) Single issue C$1.00 for Canada, U.S., and Mexico; for other countries C$1.25:

vol. 23, no. 3, March 1966, 150 pp. Includes articles on: "Effects of salinity and temperature on embryonic development of the Pacific cod (Gadus macrocephalus)," by C. R. Forrester and D. F. Alderdice; "Swimming endurance of some Northwest Atlantic fishes," by F. W. H. Beamish; "Protein nutritive quality of commercial fish meals as assessed by biological and chemical methods," by B. E. March, Jacob Biely, C. Goudie, and H. L. A. Tarr; and "Selectivity of gill nets, especially to lake whitefish," by H. A. Regier and D. S. Robson.

vol. 23, no. 4, April 1966, pp. 471-621. Includes articles on "Appropriate size limits for lemon sole (Parophrys vetulus) in the Strait of Georgia," by K. Radway Allen and C. R. Forrester, pp. 511-520; "Reproduction in Sphyrion lumpi, a copepod parasitic on redfish (Sebastes spp.)," by H. J. Squires, pp. 521-526; "Glycogenolytic enzymes of cod (Gadus callarias) muscle," by J. R. Burt, pp. 527-538; "Procedure for analysis of schooling behavior," by John R. Hunter, pp. 547-562; "In vitro cultivation of cells of the oyster (Crassostrea virginica)," by M. F. Li, James E. Stewart, and R. E. Drinnan, pp. 595-599; "Preservation of the sardine Sardinella melanura by low-dose gamma radiation," by S. Hashish, M. F. Hussein, M. M. Abdel-Baki, H. M. Rousldy, and Y. M. Hassan, pp. 601-606; "Description of groundfish trawl developed for the side-trawl research vessel G. B. Reed," by W. R. Harling and S. J. Westrheim, pp. 611-613.

CATFISH:

"Catfish by the acre," by McFadden Duffy, article, Louisiana Conservationist, vol. 18, nos. 5 & 6, May-June 1966, pp. 18-23, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130. Discusses spawning, raising, and marketing catfish; how catfish can clean unwanted bacteria and pollution material out of streams and rivers; catfish farms. Also discusses how catfish can become Louisiana's most profitable crop; what is needed for--and how to get into the catfish-raising business. The demand for catfish is greater than the present production.

"Catfish, catfish, catfish," by Jack Williamson, article, Mississippi Game and Fish, vol. 26, no. 2, Mar.-Apr. 1966, pp. 6-7, illus., printed. Mississippi Fish and Game Commission, Woolfolk Bldg., 501 N. West St., Jackson, Miss. 39201. For the benefit of persons who are interested in raising channel catfish, the author discusses pond construction, spawning pens, spawning containers, care of brood stock, stocking and cultural methods, catfish fry production, care of rearing pond, and feeding.

CENSUS SURVEY:

1963 Census of Commercial Fisheries, FC63-1, 25 pp., printed, 1966, 25 cents. U. S. Department of Commerce, Washington, D. C. 20230. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Presents results of the census of commercial fisheries for the calendar year 1963, and is based on a survey conducted by the Bureau of the Census, Department of Commerce, in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior. The 1963 Census of Commercial Fisheries is the first such census undertaken since 1908. Prior to the 1908 census, there were two census surveys of commercial fisheries, one in 1889 and the other in 1880.

CHARTS OF WRECKS:

Kingfisher Charts, Research & Development Bulletin No. 18, 11 pp., illus., printed, March 1966. Research Secretary, The White Fish Authority, 2/3 Cursitor Street, London, E. C. 4., England. Lists a series of charts showing obstructions and wrecks. Of the 14 already published, 11 cover what are broadly described as the North Sea areas and include such grounds as the Skagerrak Approach, the Coast of Denmark, and the North Fisher Bank area. Another 24 charts are in various stages of preparation. There are charts that give information on the trawling areas between Scotland and the Faroes, off the coasts of Iceland and Labrador, the Barents Sea, the Norwegian coast, and around Bear Island.

CHEMICAL COMPOSITION:

"Rapid determination of fat in fish and fish products," by E. F. Il'chev, article, Chemical Abstracts, vol. 62, May 24, 1965, Abstract No. 13767d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

CHOLESTEROL:

"The absence of cholesterol synthesis in the crab, Cancer pagurus," by Andre Van den Oord, article, Chemical Abstracts, vol. 62, Mar. 1, 1965, Abstract No. 5614f, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

COD:

The Cod and the Cod Fishery at Faroe, by B. W. Jones, Fishery Investigations, series II, vol. XXIV, no. 5, 32 pp., illus., printed, 1966, 11s. (about US$1.55). W. S. Cowell Ltd., Ipswich, England. Ministry of Agriculture, Fisheries and Food, London. (Sold by Her Majesty's Stationery Office, 49 High Holborn, London W. C. 1, England. The study was undertaken to provide information on the basic biology of the Faroe cod and to assess from the available data and original research the effect of fishing on the stocks of cod.

Articles from Journal of the Science of Food and Agriculture, illus., printed. Society of Chemical Industry, 14 Belgrave Square, London S.W.1, England. Single copy 17s. 6d. (US$2.45):

"Lipid distribution and recovery during salt fractionation of cod muscle," by Ayman Sheltawy and June Olley, vol. 17, no. 2, February 1966, pp. 94-100.

"Protein denaturation in frozen fish. Changes in cod muscle in the unfrozen state, with some further observations on the principles underlying the cell fragility method," by R. M. Love, M. M. Aref, M. K. Elerian, J. I. M. Ironside, E. M. Mackay, and M. G. Varela, vol. 16, May 1965, pp. 259-267.

Articles from Journal of the Fisheries Research Board of Canada, printed. (Sold by Queen's Printer, Ottawa, Canada.):

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Lysolecithinase of cod muscle," by M. Yurkowski and H. Brockerhoff, vol. 22, May 1965, pp. 643-652.

"Studies on the quality of Newfoundland cod. 10 - Effect of some commercial freezing rates on the frozen and stored quality of trap cod," by W. A. MacCallum, Dorothy A. Chalker, and E. J. Laishley, vol. 22, March 1965, pp. 411-420.

"Studies on the quality of Newfoundland cod. II - Thaw-drip in polyphosphate-treated and untreated fillets," by Dorothy A. Chalker and W. A. MacCallum, vol. 22, May 1965, pp. 783-791.

COD WORMS:
Cod Worms, by B. B. Rae and G. H. O. Burgess, Torry Advisory Note no. 24, 7 pp., printed, 1965. Torry Research Station, Ministry of Technology, 135 Abbey Road, Aberdeen, Scotland. This Note gives a brief account of the occurrence of worms in cod, for the information and guidance of those engaged in the handling, processing, retailing, and preparation of fish for food.

COLD STORAGE:
Cold Storage of Frozen Fish, Torry Advisory Note no. 28, 12 pp., printed, 1965. Torry Research Station, Ministry of Technology, 135 Abbey Road, Aberdeen, Scotland. This Note gives the reasons why fish must be kept at a low temperature during cold storage, and indicates for how long different products can be kept.

CRABS:
Handling and Processing Crabs, by J. C. Early, Torry Advisory Note 26, 10 pp., printed, 1965. Torry Research Station, Ministry of Technology, 135 Abbey Road, Aberdeen, Scotland. This Note briefly describes the handling, storage, and transport of the live crabs; killing, boiling, and extraction of the meat; and freezing and canning.

Phenoloxidase activity in crab leukocytes during the intermolt period," by W. Decleir and R. Vercauteren, article, Chemical Abstracts, vol. 63, Nov. 8, 1965, Abstract No. 13747c, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

CRAWFISH:
"More about crawfish," by Cecil LaCaze, article, Louisiana Conservationist, vol. 18, nos. 5 & 6, May-June 1966, pp. 3-7, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130. Discusses very briefly the life history and habits of some of the many species of fresh-water crawfish. The author discusses in greater detail the harvesting of crawfish in Louisiana and farming in artificial impoundments.

CRAYFISH:
"Carotenoids of cavernicolous crayfish," by Douglas A. Wolfe and David G. Cornwall, article, Science, vol. 144, June 19, 1964, pp. 1467-1468, printed. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20006.

CRUSTACEA:
"The Gomori method for identification of acid phosphatase in tissues of crustacea Porcellio scaber and Oniscus asellus," by Zofia Hryniewicka-Szyfter, article, Chemical Abstracts, vol. 61, Nov. 9, 1964, Abstract No. 12375e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Pheromone: Evidence in a decapod crustacean," article, Science, vol. 151, no. 3708, Jan. 21, 1966, pp. 340-341, printed. American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

CUBA:
"Coup d'oeil sur les pêches Cubaines" (A glance at Cuban fisheries), by A. Briantais, article, La Peche Maritime, vol. 45, no. 1057, April 1966, pp. 253-255, illus., printed in French. Les Editions Maritimes, 190, Boulevard Haussmann, Paris, France.

DECOMPOSITION:
"Ammonia as an index of decomposition in crab meat," by James L. Burnett, article, Journal of the Association of Official Agricultural Chemists, vol. 48, June 1965, pp. 624-627, printed. Association of Official Agricultural Chemists, Inc., Box 540, Benjamin Franklin Station, Washington, D. C. 20004.

DEHYDRATION:
"Developments of dehydrated meat and fish salads for military use," by J. M. Tuomy, article, Food Technology, vol. 19, June 1965, pp. 46, 50, printed. Institute of Food Technologists, Special Services Office, 510 North Hickory St., Champaign, Ill. 61820.

DOGFISH:
"Om mulighetene for pigghåfiske I vestatlanteren om sommeren," (Possibilities for a dogfish fishery in the Western Atlantic in the summer), by Olav Aasen, article, Fiskets Gang, vol. 15, April 14, 1966, pp. 281-287, illus., printed in Norwegian. Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

"Steroid biosynthesis in the semen of dogfish (Squalus acanthias)," by T. H. Simpson, R. W. Wright, and Joyce Renfrew, article, Chemical Abstracts, vol. 62, Mar. 1, 1965, Abstract No. 5615b, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

ECUADOR:
"Las pesquerias en la provincia de Esmeraldas" (The fisheries of the province of Esmeralda), by Domingo Quiroga, article, Puntal, vol. XII, no. 138, Sept. 1965, pp. 8-15, illus., printed in Spanish. Puntal, Apartado 316, Alicante, Spain.

EXPORTS:
"Sea Fare from U. S. Sells," article, International Commerce, vol. 72, no. 17, April 25, 1966, pp. 8-9, illus., printed, single issue US$0.35. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (Sold by Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Describes international trade promotion of U. S. Bureau of Commercial Fisheries, including food-fair participation in Cologne, Brussels, London, Milan, and Manchester.

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FILLETS:
Articles from Supplement to Fishing News and Fishing News International, July 1965, printed. Fishing News, Ludgate House, 120 Fleet Street, London E.C. 4, England:

"Freezing fillets," by J. J. Diestel, pp. 52-55.

"Freezing fillets at sea," by N. R. Jones, pp. 40-46.

FISH COOKERY:
"Chicken/fish coating mix," article, Canner/Packer, vol. 134, Mar. 1965, p. 48, printed. Canner/Packer, Triad Publishing Co., 59 East Monroe St., Chicago, Ill. 60603.

FISH FINDERS:
"Detection of disbursed fish near the sea bottom by means of echo sounders," by K. I. Yudanov, article, Trudy, vol. 3, 1961, pp. 175-183, printed. Atlanticheskii Nauchno-issledovstel'skii, Institut Morskogo Rybnogo Khoziaistvo i Okeanografii, Latviisk, SSR. (Sold by: Four Continent Book Corp., 156 - 5th Avenue, New York, N. Y. 10010.)

FISHERY RESEARCH:
Quarterly Report, Iowa Cooperative Wildlife and Fisheries Research Units, vol. 31, no. 3, January, February, March 1966, 18 pp., processed. Department of Zoology and Entomology, Iowa State University of Science and Technology, Ames Iowa 50012. Includes among others: "Factors affecting fish production in ponds," "Stream biology as related to fish production: Des Moines River," and "Dynamics of fish populations in natural lakes: Clear Lake investigations."

FISH HATCHERIES:
"Louisiana's fish hatcheries," by Sammy Stokes, article, Louisiana Conservationist, vol. 18, nos. 5 & 6, May-June 1966, pp. 8-9, 23-24, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130. Discusses types and quantities of fish Louisiana's hatcheries produce, how harvested, and species that are presently under study.

FISH MEAL:
"Analysis of lipids in fish meal," by P. F. Parks and M. S. Hummel, article, Journal Association of Official Agricultural Chemists, vol. 48, 1965, pp. 781-785, printed. Association of Official Agricultural Chemists, Box 450, Benjamin Franklin Station, Washington, D. C. 20044.

"The effect of L (—) lysine hydrochloride on the gross protein value of experimentally prepared and market products of fish and meat meals," by A. Anwar, article, Poultry Science, vol. 44, May 1965, pp. 745-747, printed. Poultry Science, Texas A & M College System, College Station, Tex. 77843.

FISH OIL:
"Effects of fat addition on chick growth. II--Fish oil as an additional fat component of a ration," by T. Katsuki, T. Konno, and K. Hangui, article, Chemical Abstracts, vol. 63, Oct. 25, 1965, Abstract No. 12053e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Studies with menhaden oil in practical-type broiler rations," by Spencer H. Morrison, article, Feedstuffs, vol. 37, July 17, 1965, p. 32, printed. Feedstuffs, P. O. Box 67, Minneapolis, Minn. 55440.

FISH PROTEIN CONCENTRATE:
"The effect of a supplementary protein food containing fish flour (from sardine oil) on the metabolism of nitrogen, calcium, and phosphorus in children," by S. R. Shurpalekar, et al, article, Chemical Abstracts, vol. 61, October 26, 1964, Abstract No. 11077e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

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"The deep-sea prawn (Pandalus borealis) in Icelandic waters," by Adalsteinn Sigurdsson and Ingvar Hallgrimsson, pp. 105-108.

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scope and potential than it may appear because it has the possibility of being applied to any plant where sequence and timing are important. This aid describes how numerical control works, discusses its advantages and disadvantages, and offers a guide which should be useful when it is introduced in a plant.

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briforms: catches in all oceans; catches in the Atlantic; processed production, exports, and imports; and the Japanese Atlantic fishery.

Greening in Tuna and Related Species, by N. Tomlinson (with appendices by E. Bilinski, A. G. Comer, S. E. Geiger, et al), Bulletin of the Fisheries Research Board of Canada No. 150, 21 pp., illus., printed, 1966, C$1.25. Queen's Printer, Ottawa, Canada. This bulletin reviews the literature regarding the development of undesirable tan to brownish-green ("greening") colors in tuna during precooking. Tests are described, and their limitations indicated, for predicting whether or not tuna will yield green meat when cooked. The information available concerning the use of certain additives (reducing agents and nitrogenous haemochrome-forming compounds) during canning of tuna as a means of eliminating greening is considered, and local experience with the use of some of these compounds (ascorbic acid, sodium nitrite, and nicotinamide) is described.

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vol. XIV, no. 3, March 1966, 31 pp., illus. Includes articles on: "1965 Senesinde, kictan ag dokup toplayan trol gemisinde yeni ilerlemeler--Kisim II" (New progresses of the stern-trawler during 1965--Part II), pp. 10-13; "Deniz yosunlarindan kahverengi algler (Esumer su yosulari)--Kisim III" (The brown algae, algin from kelps and fucids--Part III), by Kikmet Akgunes, Hayati ve Tibbi Kimya Mutehassisi, pp. 14-17; "1965 Su urunleri ve mamulleri ile yan urunleri ihracatimiz" (1965 Aquatic products, fish products and byproducts exports of Turkey), pp. 17-21.

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vol. 4, no. 6, 1964. Includes article: "The recent status of world fisheries and prospects for its development," by G. V. Martinsen, pp. 939-953.

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vol. 5, no. 6, 1965. Includes articles: "The use of mechanical computers for ship-board processing of hydrometeorological information," by A. N. Shekhtman, pp. 1110-1112; "The 36th cruise of the research vessel Vitiaz," by G. B. Udintsev, pp. 1113-1118; "Meteor, a new research vessel of the Federal Republic of Germany," by L. A. Zenkevich, p. 1119; "New methods for underwater investigation in the U.S.," by V. G. Samarin and P. A. Borovikov, pp. 1120-1122; "A new Japanese research submarine," by I. V. Farengolts, p. 1123.

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rearing, shellfish biology and cultivation, shellfish pests, and microbiology and shellfish cleansing. Also included are descriptions of gear research; instrument development; hydrography, radioactive waste disposal, health physics, and radiobiology; and other projects. A publications list is included.

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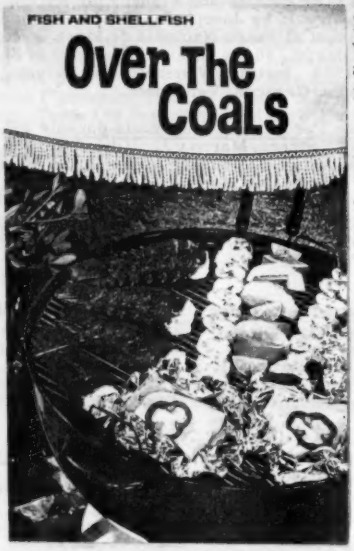
"FISH AND SHELLFISH OVER THE COALS" RECIPE BOOKLET REISSUED

With the arrival of the outdoor cooking season in most sections of the Nation, the popular recipe booklet "Fish and Shellfish Over the Coals" is again made available by the U. S. Department of the Interior's Bureau of Commercial Fisheries. The booklet was originally published last summer, and found immediate popularity with backyard chefs and sport fishermen. Many anglers "borrowed" the household copy to help in preparing their catch while on fishing trips.



The publication is part of the Bureau's continuing cooperation with the fishing industry of the United States to better acquaint the public with the economy and nutritive value of fish and shellfish as everyday foods, said Donald L. McKernan, Bureau Director.

Bureau home economists tested nearly 40 recipes for outdoor cooking of various seafood delicacies, such as lobster tails, broiled scallops, flounder with crab stuffing, rainbow trout, and many others.

"Fish and Shellfish Over the Coals" (Test Kitchen Series No. 14), which features easy-to-follow recipes and full-color illustrations, is available for 40 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

GREAT CIRCLE OCEAN RIVER IN PACIFIC OCEAN PROBED

Scientists are probing the depth, origin and flow rate of the great circular ocean river that constantly surges around the edges of the Pacific Ocean.

This vast belt of moving water, sometimes 600 miles wide, affects in many unknown ways the weather and climate of Pacific shores, as well as the movements of fish, crabs, plants, and other marine life.

The current flows west along the north edge of the equator, turns north at the Philippines to form the Kuroshio Current, then crosses the North Pacific and heads south along the Pacific coast as the California Current.

Reports on the origin and depth of the Kuroshio Current, the Pacific Ocean's equivalent of the Atlantic's Gulf Stream, were made by a Japanese ocean survey group. It was the first phase of a cooperative ocean current study coordinated by the Intergovernmental Oceanographic Commission, which is sponsored by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). (Science News Letter, February 12, 1966.)

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